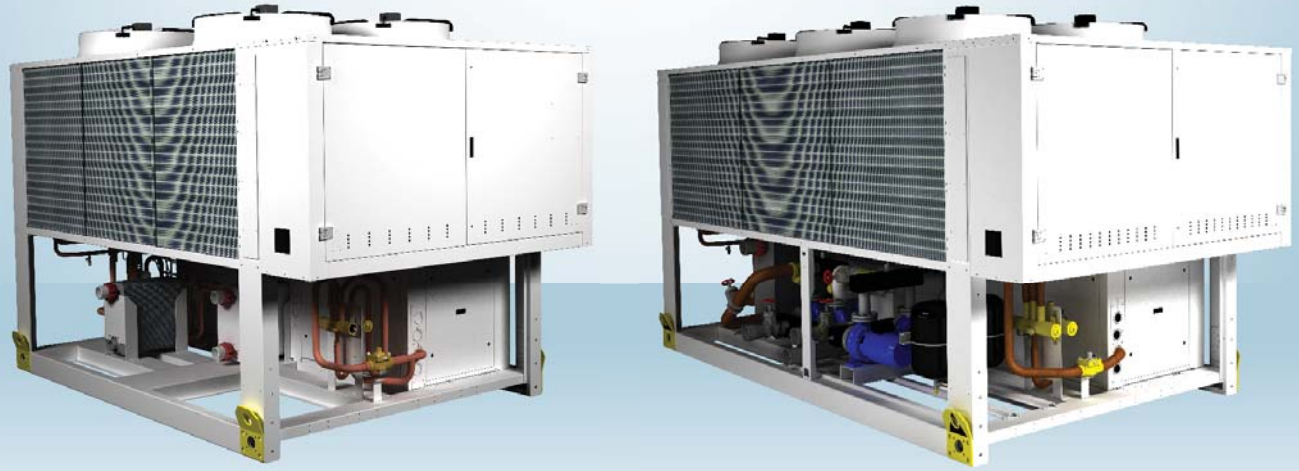
AERMEC
air conditioning



R410A

MULTIPURPOSE UNITS FOR 2|4-PIPE SYSTEMS - Technical installation manual

MULTIPURPOSE UNIT

- **OUTDOOR UNIT**
- **HIGH EFFICIENCIES**

NRP 0800-1800

EN

INRPPY.12.02.5806765_00

Dear Customer,
Thank you for choosing an AERMEC product. This product is the result of many years of experience and indepth engineering research, and it is built using top quality materials and advanced technologies.
In addition, the CE mark guarantees that our appliances fully comply with the requirements of the European Machinery Directive in terms of safety. We constantly monitor the quality level of our products, and as a result AERMEC products are synonymous with Safety, Quality, and Reliability.

The data may be subject to modifications deemed necessary for improving the product at any time and without forewarning.

Thank you again.
AERMEC S.p.A

AERMEC S.p.A. reserves the right to make any modifications considered necessary to improve its products at any moment and is not obliged to add these modifications to machines that have already been manufactured, delivered or are under construction.

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NRP

SERIAL NUMBER	

DECLARATION OF CONFORMITY We, the undersigned, hereby declare under our own responsibility that the assembly in question, defined as follows:

NAME **NRP**

TYPE **MULTIPURPOSE AIR/WATER**

MODEL

To which this declaration refers, complies with the following harmonised standards:

IEC EN 60335-2-40	Safety standard regarding electrical heat pumps, air conditioners and dehumidifiers.
IEC EN 61000-6-1 **IEC EN 61000-6-3**	Immunity and electromagnetic emissions for residential environments.
IEC EN 61000-6-2 **IEC EN 61000-6-4**	Immunity and electromagnetic emissions for industrial environments.
EN378	Refrigerating system and heat pumps - Safety and environmental requirements.
UNI EN 12735	Seamless, round copper pipes for air conditioning and refrigeration.
UNI EN 14276	Pressurised equipment for cooling systems and heat pumps.

Thereby, compliant with the essential requirements of the following directives:

- LVD Directive: 2006/95/CE
- Electromagnetic Compatibility Directive 2004/108/CE.
- Machinery directive 2006/42/CE
- PED Directive regarding pressurised devices 97/23/CE

The product, in agreement with Directive 97/23/EC, satisfies the Total quality Guarantee procedure (form H) with certificate no. 06/270-QT3664 Rev. 6 issued by the notified body n.1131 CEC via Pisacane 46 Legnano (MI) - Italy

The person authorised to draw-up the technical file is: Massimiliano Sfragara - 37040 Bavilacqua (VR) Italy - Roma, 996

Bevilacqua 09/01/2012

Marketing Manager
Signature

Standards complied with WHEN DESIGNING and CONSTRUCTING the unit:
SAFETY
1. Machinery directive 2006/42/EC
2. Low voltage directive LVD 2006/95/EC
3. Electromagnetic compatibility directive EMC 2004/108/EC
4. Directive regarding pressurised devices PED 97/23/EC, EN 378,
5. UNI12735, UNI14276

ELECTRIC PART
1. IEC EN 60335-2-40,
2. IEC EN 61000-6-1/2/3/4

ACOUSTIC PART
1. ISO DIS 9614/2 (intensimetric method)

PROTECTION RATING
IP24

REFRIGERANT GAS
This unit contains fluoride gases with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must only be performed by qualified staff, in compliance with standards in force.

1. DESCRIPTION OF THE UNIT

Multipurpose **OUTDOOR** units for 2 or 4 pipe systems, especially designed for simultaneous, autonomous production of **cold** and **hot** water.

AVAILABLE VERSIONS

1.1. FOR 2-PIPE SYSTEMS

The multipurpose 2-pipe units have been made to respond to the demands of hotels, where there is a high cold/hot water and DHW demand throughout the year.
The operating modes are:

SUMMER OPERATION
1. Cold water production at system
2. Production of DHW with use of total recovery device

WINTER OPERATION
3. Heat pump supplying the system.
4. Heat pump for DHW.

1.2. FOR 4-PIPE SYSTEMS

The multipurpose 4-pipe units have been made to respond to the demands of shopping centres, offices or facilities with large windows, where there can be the simultaneous demand for hot and cold water with a system which does not require season changeover and therefore is a valid alternative to traditional systems based on the chiller-boiler combination.
The microprocessor control logic mounted ensures perfect satisfaction of heating and cooling loads.
The operating modes are:

PRODUCTION OF COOLED WATER ONLY
The multipurpose unit acts as a classical chiller: cool water to the system and condensation heat disposal outside through finned coils.

PRODUCTION OF HOT WATER ONLY
The multipurpose unit acts as a heat pump, exploiting the heat of the outside air it makes use of the finned coil (evaporator) to raise the temperature of the water to be sent to the system through a plate heat exchanger (condenser). The main difference with respect to traditional heat pumps with cycle inversion is that the heated water is produced in an exchanger different to that used for the production of cold water. This is to keep the heating and cooling sections necessary for 4-pipe systems well distinguished.

COMBINED PRODUCTION
If the utility requires simultaneous hot and cold water, the unit acts as a water/water heat pump, controlling condensation and evaporation on two distinct plate heat exchangers associated to the circulation of cold and hot water in the system.
It automatically changes from one configuration to the other (managed by on-board microprocessor) to optimise the energy spent depending on the demand by the utility.
Maximum reliability
Multi-circuit unit (from two to four depending on the model) designed to provide maximum efficiency both with full load and partial loads, guaranteeing operating continuity should one of the circuits stop to facilitate maintenance.
Having several compressors ensures control of more capacity steps yielded in both modes.

Built-in hydronic kit
Which encloses the main hydraulic components it is available in different configurations with single pump or with reserve pump, with high or low head pressure (see configuration).

2. CONFIGURATOR

Field	Description
1,2,3	**NRP**
4,5,6	**SIZE**
	080 - 090 - 100 - 125 - 140 - 150 - 165 - 180
7	**START-UP DELAY**
	0
8	**VERSION**
A	High efficiency
E	Silenced high efficiency
9	**SYSTEM TYPE** [1]
2	Two pipes
4	Four pipes
10	**COILS**
SDgr	Aluminium
R	Copper
S	Tinned copper
V	In painted aluminium-copper (epoxy powders)
11	**FANS**
SDgr	Standard
J	Updated inverters
12	**POWER SUPPLY**
SDgr	400V/3/50Hz with magnet circuit breakers
2	500V/3/50Hz with magnet circuit breakers
13,14	**SYSTEM SIDE HYDRONIC KIT**
00	Without storage tank
P1	Low head pressure pump | system side
P2	Low head pressure pump | reserve pump | system side
P3	High head pressure pump | system side
P4	High head pressure pump | reserve pump | system side
15,16	**DHW SIDE / SYSTEM SIDE HYDRONIC KIT** [2]
00	Without Pumps
R1	Low head pressure pump | DHW side
R2	Low head pressure pump | reserve pump | DHW side
R3	High head pressure pump | DHW side
R4	High head pressure pump | reserve pump | DHW side

NRP 0800-1000 — **POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS**

system hydronic unit \ recovery hydronic unit	SDgr	R1	R2	R3	R4
SDgr	ok	ok	na	ok	na
P1	ok	ok	na	ok	na
P2	ok	ok	na	ok	na
P3	ok	ok	na	ok	na
P4	ok	ok	na	ok	na

NRP 1250-1800 — **POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS**

system hydronic unit \ recovery hydronic unit	SDgr	R1	R2	R3	R4
SDgr	ok	ok	ok	ok	ok
P1	ok	ok	ok	ok	ok
P2	ok	ok	ok	ok	ok
P3	ok	ok	ok	ok	ok
P4	ok	ok	ok	ok	ok

2 DHW SIDE/SYSTEM SIDE
DHW side, production of domestic hot water, in 2-pipe systems.
System side, production of hot water, in 4-pipe systems.

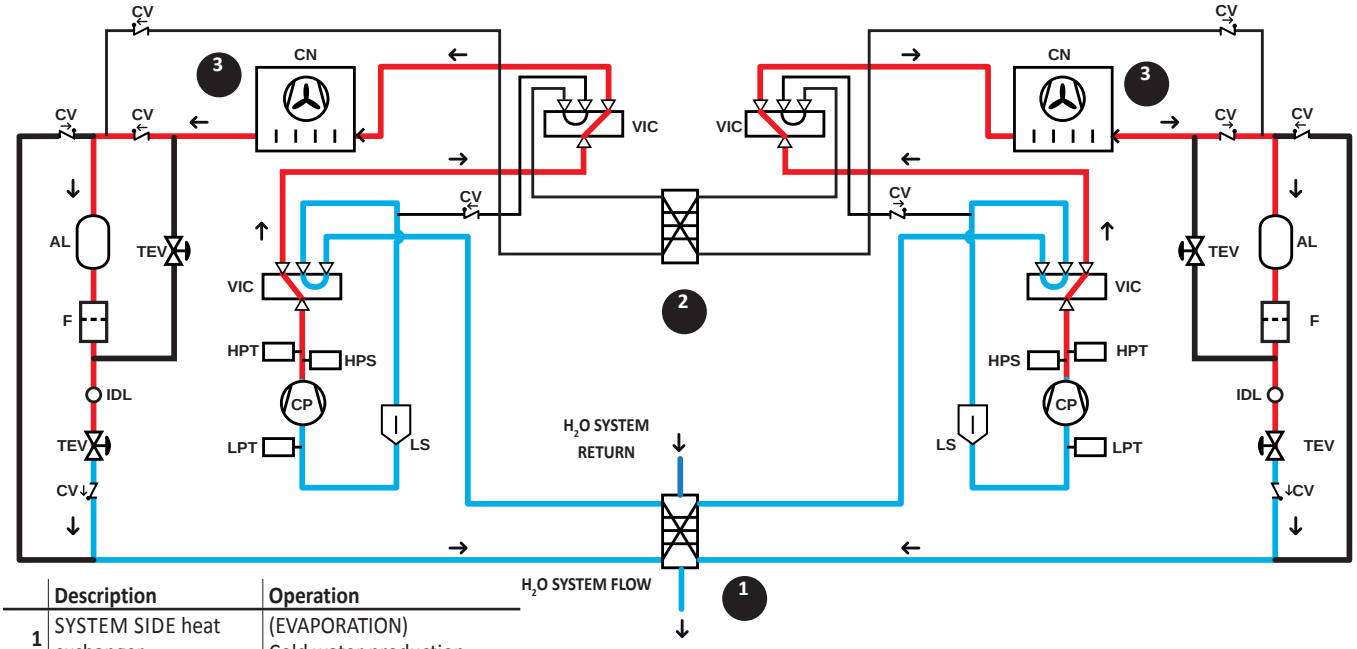
Reading key

1. The configuration desired must be specified when ordering

na Not available

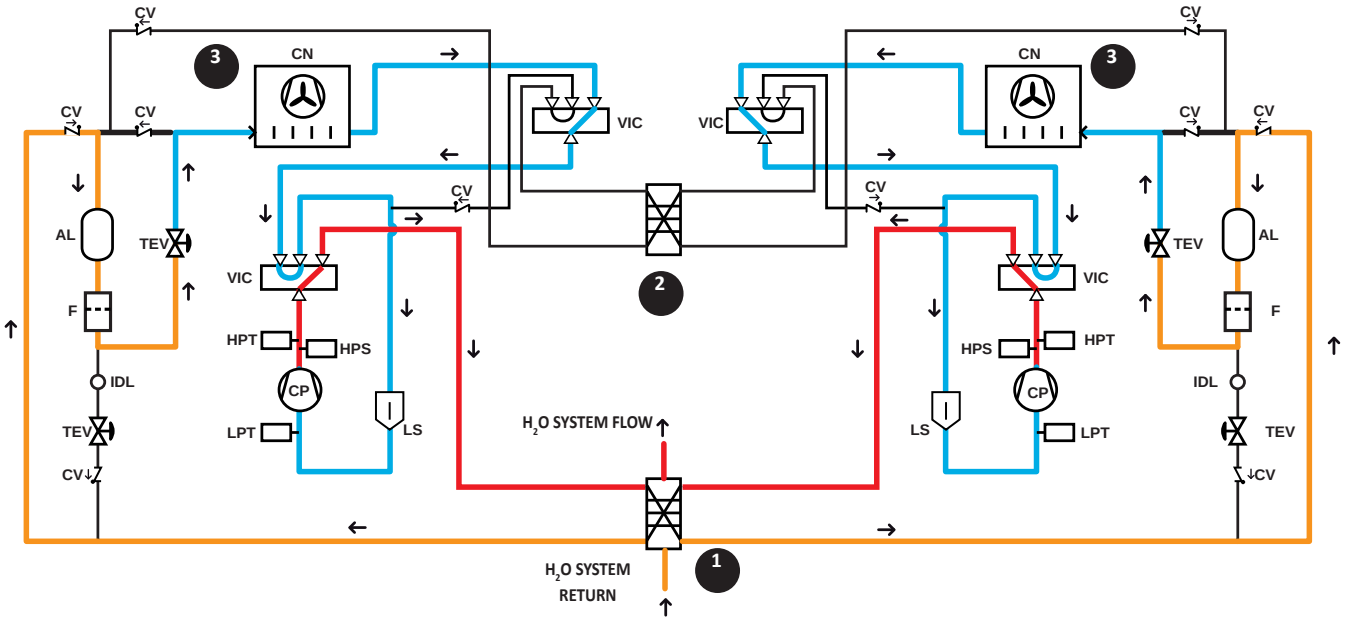
3. BASIC OPERATING LAYOUTS FOR 2-PIPE SYSTEM

3.1. COLD WATER PRODUCTION ONLY TO SYSTEM



	Description	Operation
1	SYSTEM SIDE heat exchanger	(EVAPORATION) Cold water production
2	DHW SIDE heat exchanger	not running
3	SOURCE SIDE heat exchanger	(CONDENSATION) Heat exchange with air

3.2. HOT WATER PRODUCTION ONLY TO SYSTEM

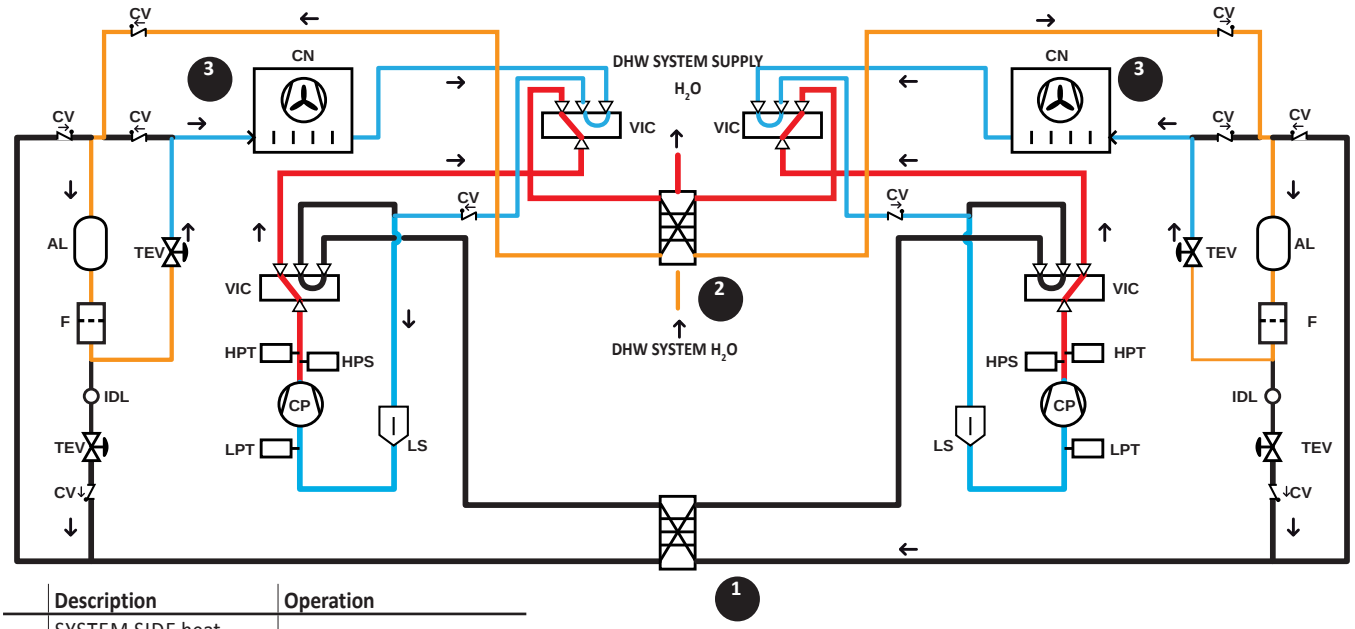


	Description	Operation
1	SYSTEM SIDE heat exchanger	(CONDENSATION) Hot water production
2	DHW SIDE heat exchanger	not running
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

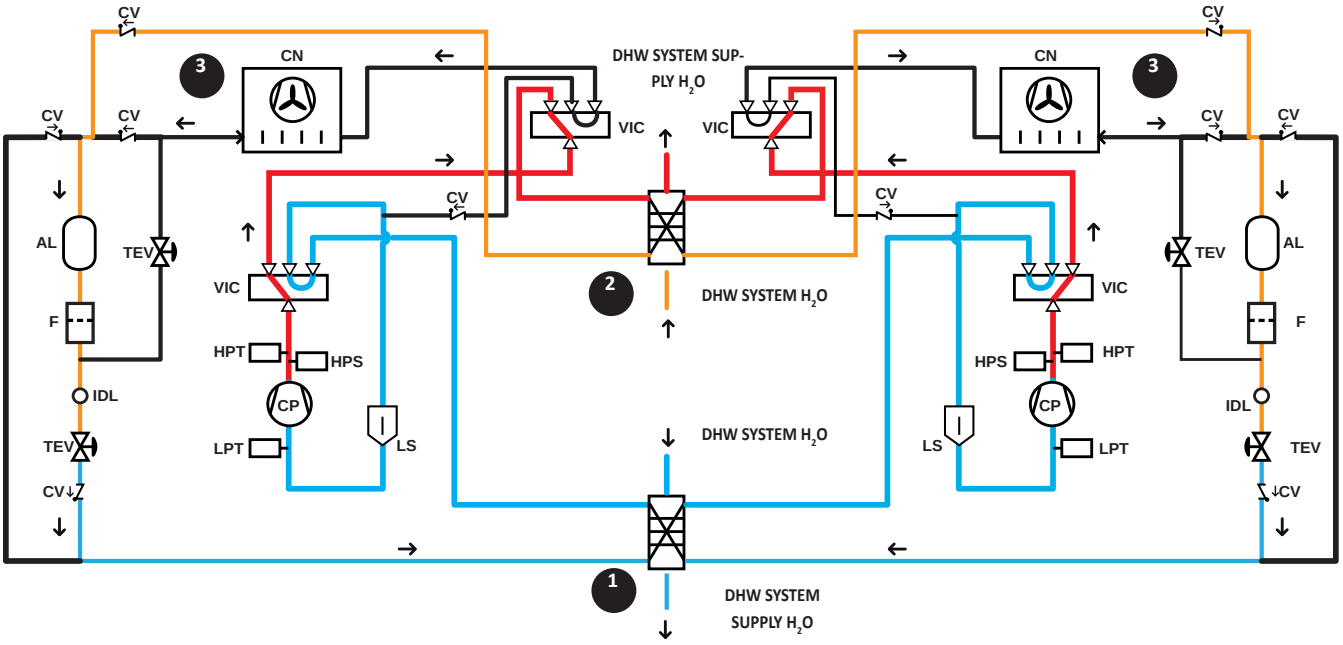
IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

3.3. 2 CIRCUITS TO PRODUCE HOT WATER ONLY TO DHW



	Description	Operation
1	SYSTEM SIDE heat exchanger	Not running
2	DHW SIDE heat exchanger	(CONDENSATION) DHW production
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

3.4. 2 CIRCUITS TO PRODUCE COLD WATER TO SYSTEM AND HOT WATER TO DHW

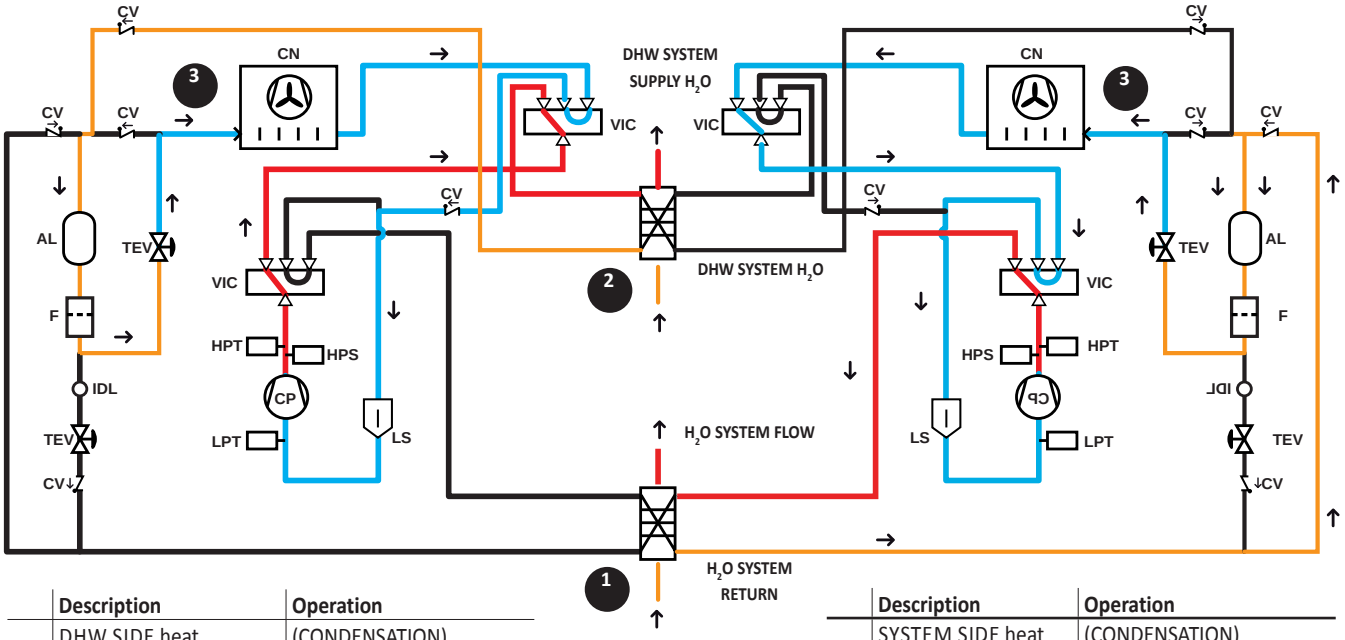


	Description	Operation
1	SYSTEM SIDE heat exchanger	(EVAPORATION) Cold water production
2	DHW SIDE heat exchanger	(CONDENSATION) DHW production
3	SOURCE SIDE heat exchanger	Not running

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

3.5. CIRCUIT FOR PRODUCING HOT WATER TO SYSTEM | CIRCUIT FOR PRODUCING HOT WATER TO DHW

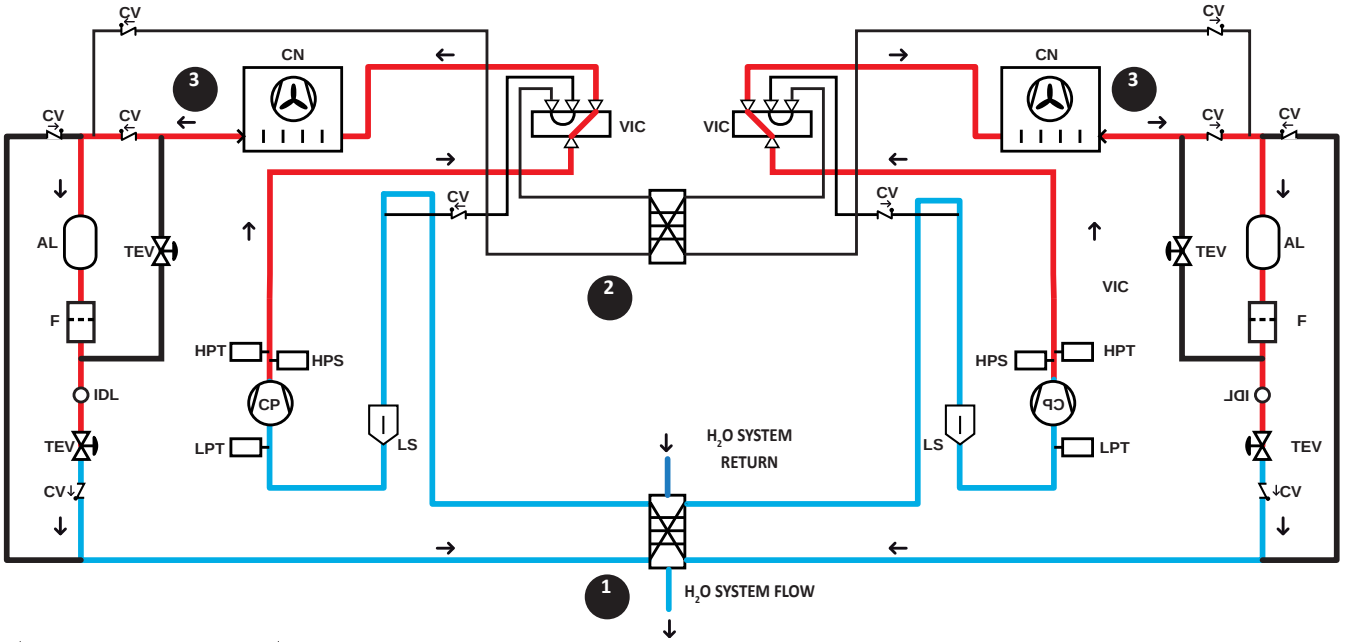


	Description	Operation
2	DHW SIDE heat exchanger	(CONDENSATION) DHW production
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

	Description	Operation
1	SYSTEM SIDE heat exchanger	(CONDENSATION) Hot water production
3	SYSTEM SIDE heat exchanger	(EVAPORATION) Heat exchange with air

4. BASIC OPERATING LAYOUTS FOR 4-PIPE SYSTEM

4.1. COLD WATER PRODUCTION ONLY TO SYSTEM

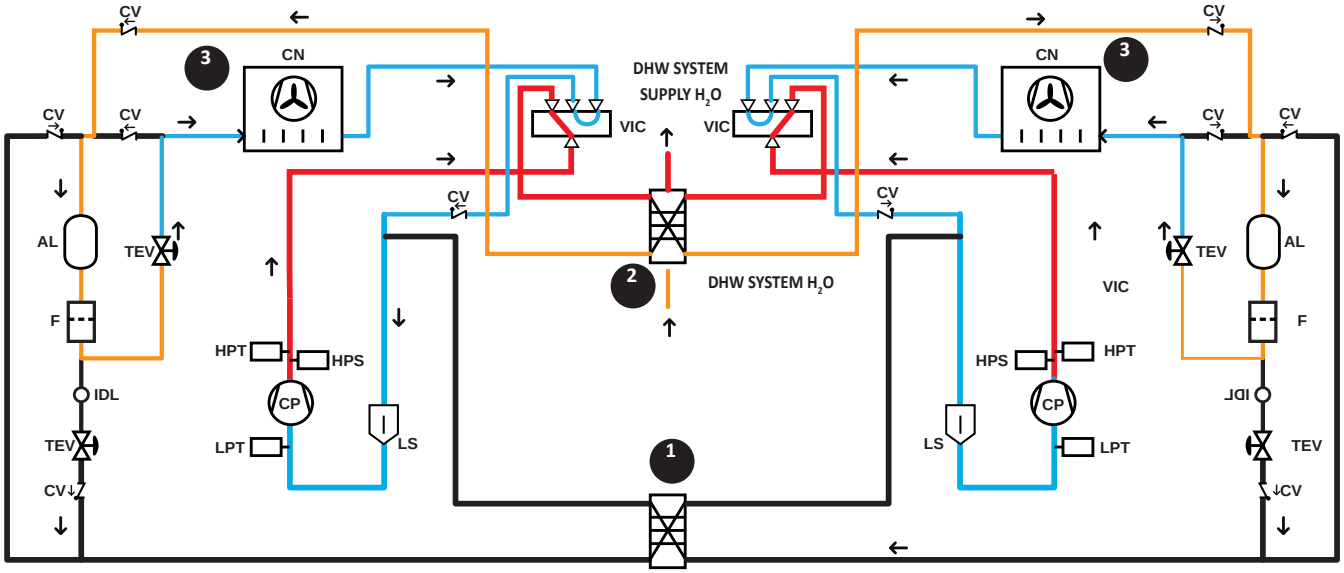


	Description	Operation
1	SYSTEM SIDE heat exchanger	(EVAPORATION) Cold water production
2	DHW SIDE heat exchanger	not running
3	SOURCE SIDE heat exchanger	(CONDENSATION) Heat exchange with air

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

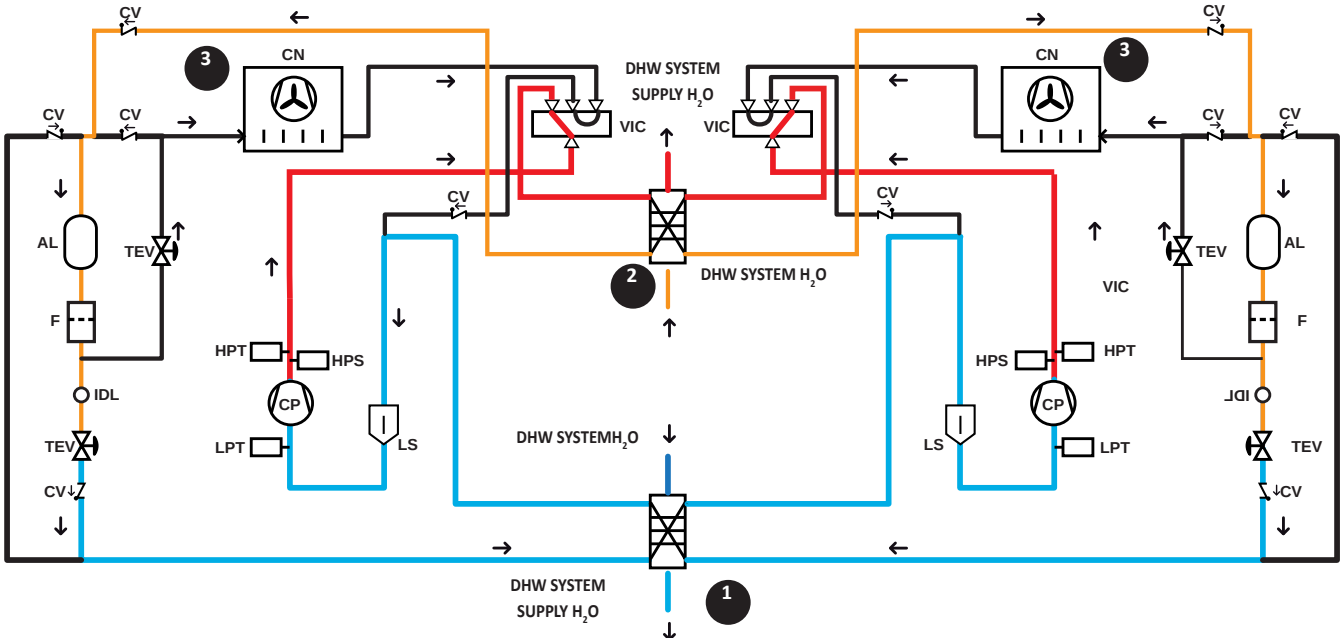
IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

4.2. HOT WATER PRODUCTION ONLY TO SYSTEM



	Description	Operation
1	COOLING SIDE heat exchanger	Not running
2	HEATING SIDE heat exchanger	(CONDENSATION) hot water production
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

4.3. SIMULTANEOUS HOT AND COLD WATER PRODUCTION TO SYSTEM



	Description	Operation
1	COOLING SIDE heat exchanger	(EVAPORATION) Cold water production
2	HEATING SIDE heat exchanger	(CONDENSATION) hot water production
3	SOURCE SIDE heat exchanger	Not running

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

5. DESCRIPTION OF COMPONENTS

5.1. COOLING CIRCUIT

SCROLL COMPRESSORS
Hermetic scroll rotary compressors. All compressors come with casing resistance, electronic thermal protection with centralised manual rearm and two-pole electric motor.

SYSTEM SIDE COOLING/HEATING EXCHANGER

Braze welded AISI 316 steel plate exchanger, insulated externally with closed cell neoprene anti-condensation material. When the unit is not running, an electric resistance is used for protection against the formation of ice inside.

5.1.1. WATER FEATURES

PH	**6-8**
Electric conductivity	Less than 200 mV/cm (25°C)
Chloride ions	Less than 50 ppm
Sulphuric acid ions	Less than 50 ppm
Total iron	Less than 0.3 ppm
Alkalinity M	Less than 50 ppm
Total hardness	Less than 50 ppm
Sulphur ions	none
Ammonia ions	None
Silicone ions	Less than 30 ppm

DHW SIDE EXCHANGER (2 pipes)
SYSTEM HEATING SIDE (4 pipes)
Braze welded AISI 316 steel plate exchanger, insulated externally with closed cell neoprene anti-condensation material. When the unit is not running, an electric resistance is used for protection against the formation of ice inside.

SOURCE SIDE EXCHANGER
Finned pack heat exchanger made with copper pipes and aluminium fins adequately spaced to ensure better heat exchange performance.

CYCLE REVERSING VALVE
4-way cycle reversing valve. Inverts the flow of refrigerant gas.

LIQUID STORAGE TANK
(always passed through)
It compensates the difference in volume between finned coil and plate exchanger, retaining excess liquid.

DEHYDRATOR FILTER
Hermetic-mechanical with ceramic and hygroscopic material cartridges, able to withhold impurities and any traces of humidity present in the cooling circuit.

NON-RETURN VALVES
Allow one-way flow of the refrigerant.

THERMOSTATIC VALVE
Mechanical valves with external equaliser, positioned: at evaporator outlet, they modulate the flow of gas to the evaporator, depending on the heat load, in order to ensure a correct heating level of the intake gas.

SOLENOID VALVES
The valve closes when the compressor switches off, blocking the flow of refrigerant gas to the evaporator, recovery device and the coil.

LIQUID SEPARATOR
Positioned at compressor intake to protect from any liquid refrigerant return, flooded start-up and operation with the presence of liquid.

LIQUID PASSAGE INDICATOR WITH HUMIDITY PRESENCE SIGNAL
Used to check presence of humidity in cooling circuit.

5.2. STRUCTURE AND FANS

SUPPORT STRUCTURE
Structure made of hot-dipped galvanised steel sheets, painted with polyester powders, built to guarantee easy accessibility for service and maintenance.

STANDARD FANS
Axial fans with IP 54 degree of protection, external rotor, helical blades, housed in nozzles, complete with accident-prevention protective screen. 6-pole electric motor with built-in magnet circuit breaker.

INVERTER ENHANCED CAPACITY FANS

	System 2 pipe		System 4 pipe	
	System	**DHW**	**Cooling side**	**Heating side**
STANDARD HYDRAULIC CIRCUIT ON ALL VERSIONS				
Filter	Supplied	No	Supplied	No
Flow switch	As per standard	No	As per standard	No
VERSIONS WITH PUMPS ONLY (the more complete versions are described)				
Filter	As per standard	As per standard	As per standard	As per standard
Pump/s	As per standard	As per standard	As per standard	As per standard
Drain valve	As per standard	As per standard	As per standard	As per standard
Air vent valve	As per standard	As per standard	As per standard	As per standard
Expansion vessels (2x25 l)	As per standard	As per standard	As per standard	As per standard

5.3. STANDARD HYDRAULIC CIRCUIT

WATER FILTER (SUPPLIED)
(mounted in the version with pump; it is supplied for the other versions).
Equipped with steel filtering mesh, prevents the heat exchangers both of the system side and the DHW/heating system side from clogging.

FLOW SWITCH
They have the task of controlling that there is water circulation inside the heat exchangers; if this is not the case, they block the unit.

5.3.1. Components of hydraulic circuit in configurable versions

PUMPS
High or low head pressure
VENT VALVES
Mounted on the upper part of the hydraulic system; they discharge any air pockets present in the same.

EXPANSION VESSELS (2X25 l)
With nitrogen pre-load membrane.

5.4. CONTROL AND SAFETY COMPONENTS

MANUALLY RESET HIGH PRESSURE SWITCH
With fixed calibration, placed on high pressure side of cooling circuit, inhibits compressor operation if abnormal work pressure occurs.

LOW PRESSURE TRANSDUCER
Positioned on the low pressure side of the cooling circuit, it informs the control board of the work pressure, generating a pre-alarm in the event of anomalous pressure.

HIGH PRESSURE TRANSDUCER
Positioned on the high pressures side of the cooling circuit, it informs the control board of the work pressure, generating a pre-alarm in the event of anomalous pressure.

COOLING CIRCUIT SAFETY VALVES
They intervene by discharging the overpressure in the event of anomalous pressures.
- Calibrated at 45 bar on HP branch.
- Calibrated at 30 bar on LP branch.

DCPX CONDENSATION PRESSURE CONTROLLER
This accessory allows correct operation with external temperatures lower than 10°C and as low as – 10°C.
It is made up from a regulation circuit board that changes the number of fan revs. on the basis of the condensation pressure read by the high pressure transducer in order to keep it sufficiently high for correct unit operation.
It also allows correct operation in heating mode with external temperatures exceeding 30°C and up to 42°C.

5.5. ELECTRIC CONTROL BOARD

Electric control board incompliance with EN 60204-1/ IEC 204-1 Standards, complete with:
- transformer for the control circuit,
- door lock main isolating switch,
- fuses and contactors for compressors and fans,
- clamps for REMOTE PANEL,
- spring type control circuit terminal board,
- outdoor electric board with double door and gaskets,
- electronic controller,
- evaporator pump and recovery pump control consent relay (for versions without pump units only),
- all numbered cables.

DOOR-LOCK ISOLATING SWITCH
The electric control board can be accessed by removing the voltage using the opening lever on the board itself. This lever can be locked using one or more padlocks during maintenance interventions in order to prevent the machine being made live accidentally.

CONTROL KEYBOARD
Allows complete control of the appliance. For a more detailed description refer to the user manual.

NRP 0800-1000

POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS

recovery hydronic unit

system hydronic unit	SDgr	R1	R2	R3	R4
SDgr	ok	ok	na	ok	na
P1	ok	ok	na	ok	na
P2	ok	ok	na	ok	na
P3	ok	ok	na	ok	na
P4	ok	ok	na	ok	na

NRP 1250-1800

POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS

recovery hydronic unit

system hydronic unit	SDgr	R1	R2	R3	R4
SDgr	ok	ok	ok	ok	ok
P1	ok	ok	ok	ok	ok
P2	ok	ok	ok	ok	ok
P3	ok	ok	ok	ok	ok
P4	ok	ok	ok	ok	ok

6. ACCESSORIES

6.1. MECHANICAL ACCESSORIES

AVX ANTI-VIBRATION MOUNTS
Group of anti-vibration mounts.

GP PROTECTION GRIDS
Protect the external coil from blows and prevent access to the underlying area where the compressors and the cooling circuit are housed. Every kit includes two grids.

6.2. ELECTRIC ACCESSORIES

AER485P1
RS-485 interface for supervising systems with MODBUS protocol.

PGD1
Graphical display, which allows complete management of the unit, like the one on board the machine. Can be controlled up to 50 m away with a telephone cable, 200 m with a shielded AWG 24 cable.

AERWEB300
Accessory AERWEB allows remote control of a chiller through a common PC and an ethernet connection over a common browser; 4 versions available:
AERWEB300-6: Web server to monitor and remote control max. 6 units in RS485 network;
AERWEB300-18: Web server to monitor and remote control max. 18 units in RS485 network;
AERWEB300-6G: Web server to monitor and remote control max. 6 units in RS485 network with integrated GPRS modem;
AERWEB300-18G: Web server to monitor and remote control max. 18 units in RS485 network with integrated GPRS modem;

DRE
Initial starting current reduction electronic device (approximately 26% in dual circuit,). Available only with 400 V power supply. Can only be applied in the factory.

RIF
Current rephaser. Connected in parallel to the motor, it allows a reduction of the input current (approx. 10%). It can only be installed in the factory and so must be requested on ordering.

NRP		0800	0900	1000	1250	1400	1500	1650	1800
AVX	00	704	710	716	719	725	730	734	737
	P1-P2-P3-P4	706	712	712	721	727	732	736	736
	P1|R1...P4|R4	706	712	712	721	727	732	736	736
GP	ALL	GP260	GP260	GP260	GP350	GP350	GP350	GP500	GP500
ELECTRIC ACCESSORIES									
DRE	ALL	801	901	1001	1251	1401	1501	1651	1801
REF	ALL	88	90	92	92	93	94	94	94
AER485P1	ALL	•	•	•	•	•	•	•	•
PGD1	ALL	•	•	•	•	•	•	•	•
AERWEB300-6	ALL	•	•	•	•	•	•	•	•
AERWEB300-18	ALL	•	•	•	•	•	•	•	•
AERWEB300-6G	ALL	•	•	•	•	•	•	•	•
AERWEB300-18G	ALL	•	•	•	•	•	•	•	•

7. TECHNICAL DATA

Model			800	900	1000	1250	1400	1500	1650	1800
① Cooling capacity	**HA**	kW	218	243	260	323	365	402	441	477
	HE	kW	200	217	230	291	332	368	402	430
Input power	**HA**	kW	72.4	82.2	88.2	107.7	121.0	135.0	145.3	155.9
	HE	kW	80.3	94.3	100.4	120.5	134.4	149.2	161.6	175.1
Water flow rate	**HA**	l/h	37498	41841	44753	55506	62852	69171	75888	81966
	HE	l/h	34477	37289	39609	50044	57122	63288	69115	73977
Total pressure drops SYSTEM SIDE	**HA**	kPa	59	58	54	64	52	53	55	55
	HE	kPa	50	47	43	54	43	44	46	45
Useful head pressure Low head pressure	HA	kPa	123	114	111	128	128	125	106	95
	HE	kPa	135	132	131	150	149	141	126	119
Useful head pressure High head pressure	HA	kPa	240	230	225	269	266	246	241	232
	HE	kPa	252	249	247	293	289	272	261	255
② Heating capacity	**HA|HE**	kW	241	258	290	384	400	459	503	544
Input power	**HA|HE**	kW	73,2	79,7	87,8	114,5	119,5	137,6	153,0	164,6
Water flow rate	**HA|HE**	l/h	41498	44312	49946	66115	68833	78870	86579	93555
Pressure drops SYSTEM SIDE VERS. 2 PIPES	**HA|HE**	kPa	73	66	68	93	63	68	72	72
Pressure drops SYSTEM SIDE	**HE**	kPa	50	44	49	49	44	51	51	53
ENERGY INDEX										
EER	**HA**		3,01	2,96	2,95	3,00	3,02	2,98	3,04	3,06
	HE		2,50	2,30	2,29	2,41	2,47	2,47	2,49	2,46
COP	**HA|HE**		3,29	3,23	3,31	3,36	3,35	3,33	3,29	3,30
③ **TOTAL RECOVERY**										
Cooling capacity	**HA|HE**	kW	223	251	278	334	379	422	463	496
Recovered power	**HA|HE**	kW	289	328	364	432	491	550	598	642
Total input power	**HA|HE**	kW	66,0	77,0	86,0	98,0	112,0	128,0	135,0	146,0
TER - Total Rfficiency Ratio		W/W	7,76	7,52	7,47	7,82	7,77	7,59	7,86	7,79
Evaporator water flow rate	**HA|HE**	l/h	38356	43172	47817	57449	65189	72585	79637	85313
Evaporator pressure drops SYSTEM SIDE	**HA|HE**	kPa	62	62	62	71	56	58	61	60
Recovery water flow rate	**HA|HE**	l/h	49709	56417	62609	74305	84453	94601	102857	110425
Recovery pressure drops DHW SIDE/SYSTEM SIDE [1]	**HA|HE**	kPa	72	72	77	63	66	73	72	74
Useful head pressure Low headpressure pump		kPa	91	73	98	102	106	87	75	49
Useful head pressure High head pressure		kPa	204	182	158	212	197	180	213	187
UNIT PROTECTION RATING										
IP			24	24	24	24	24	24	24	24
ELECTRICAL DATA										
Power supply	V/ph/Hz		400V/3/50Hz							
Total input current	HA	A	136	158	180	196	235	273	289	304
	HE	A	145	169	192	211	251	292	306	324
Maximum current (FLA)	**HA|HE**	A	173	195	217	267	296	325	365	398
Initial starting current (LRA)	**HA|HE**	A	348	404	426	535	505	534	633	666

① COOLING

Evaporator inlet water temperature	12°C
Evaporator outlet water temperature	7°C
External air temperature	35 °C

② HEATING

Condenser inlet water temperature	40°C
Condenser outlet water temperature	45°C
External air temperature	7°C d.b. 6°C w.b.

③ COOLING with recovery (DHW/system side)

Recovery outlet water temperature	45°C
Evaporator outlet water temperature	7 °C
Δt water	5°C

1 DHW SIDE/SYSTEM SIDE

DHW side, production of domestic hot water, in 2-pipe systems.
System side, production of hot water, in 4-pipe systems.

Model			800	900	1000	1250	1400	1500	1650	1800
SCROLL COMPRESSORS										
Quantity/circuit	n°/n°		4/2	4/2	4/2	4/2	5/2	6/2	6/2	6/2
SYSTEM SIDE HEAT EXCHANGER										
Water content		dm^3	10.5	12.3	14.8	16.7	26.6	30.2	32.9	37.4
Hydraulic connections (Victaulic)		Ø	3"	3"	3"	4"	4"	4"	4"	4"
SYSTEM SIDE HYDRONIC KIT (2 AND 4 PIPES)										
EXPANSION VESSEL										
Expansion vessel		n°/l	1/24	1/24	1/24	1/24	1/24	1/24	1/24	1/24
Expansion vessel calibration		bar	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LOW HEAD PRESSURE PUMP										
Input power		kW	3	3	3	4	4	5.5	5.5	5.5
Input current		A	6.2	6.2	6.2	8.1	8.1	11	11	11
HIGH HEAD PRESSURE										
Input power		kW	5.5	5.5	5.5	7.5	7.5	7.5	11	11
Input current		A	11	11	11	14.6	14.6	14.6	21.2	21.2
DHW/SYSTEM SIDE HEAT EXCHANGER										
Water content		dm^3	12.3	14.8	16.7	26.6	30.2	32.9	37.4	41.0
Hydraulic connections (Victaulic)		Ø	3"	3"	3"	4"	4"	4"	4"	4"
DHW SIDE HYDRONIC KIT (2 PIPES) - SYSTEM HEATING SIDE (4 PIPES)										
EXPANSION VESSEL										
Expansion vessel		n°/l	1/24	1/24	1/24	1/24	1/24	1/24	1/24	1/24
Expansion vessel calibration		bar	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LOWHEAD PRESSURE PUMP										
Input power		kW	3	3	4	4	5.5	5.5	5.5	5.5
Input current		A	6.2	6.2	8.1	8.1	11	11	11	11
HIGH HEAD PRESSURE PUMP										
Input power		kW	5.5	5.5	5.5	7.5	7.5	7.5	11	11
Input current		A	11	11	11	14.6	14.6	14.6	21.2	21.2
STANDARD AXIAL FANS										
Quantity	HA	n°	4	4	4	6	6	6	8	8
	HE	n°	4	4	4	6	6	6	8	8
Air flow rate when cold	HA	m^3/h	85600	84600	83600	126000	124200	122400	168000	165600
	HE	m^3/h	59920	59220	60610	88200	90000	91800	117600	115920
Air flow rate when hot	HA	m^3/h	85600	84600	83600	126000	124200	122400	168000	165600
	HE	m^3/h	85600	84600	83600	126000	124200	122400	168000	165600
Input current when cold	HA	A	14.4	14.4	14.4	21.6	21.6	21.6	28.8	28.8
	HE	A	9.3	9.3	9.3	14.0	14.0	14.0	18.6	18.6
Input current when hot	HA	A	14.4	14.4	14.4	21.6	21.6	21.6	28.8	28.8
	HE	A	14.4	14.4	14.4	21.6	21.6	21.6	28.8	28.8
Input power when cold	HA	kW	6.8	6.8	6.8	10.2	10.2	10.2	13.6	13.6
	HE	kW	4.4	4.4	4.4	6.6	6.6	6.6	8.8	8.8
Input power when hot	HA	kW	6.8	6.8	6.8	10.2	10.2	10.2	13.6	13.6
	HE	kW	6.8	6.8	6.8	10.2	10.2	10.2	13.6	13.6
INVERTER AXIAL FANS -J-										
Static pressure		Pa	80	80	80	80	80	80	80	80

Model			800	900	1000	1250	1400	1500	1650	1800
SOUND DATA [1]										
COOLING MODE OPERATION										
Sound pressure	HA	dB(A)	56.5	56.5	56.5	59.5	59	58.5	60	62
	HE	dB(A)	51	51	51	54	53.5	53	54.5	56.5
Sound power	HA	dB(A)	88.5	88.5	88.5	91.5	91	91.5	92	94
	HE	dB(A)	83	83	83.5	86	85.5	85	86.5	88.5
HEATING MODE OPERATION										
Sound pressure		dB(A)	56.5	56.5	56.5	59.5	59	58.5	60	62
Sound power		dB(A)	88.5	88.5	88.5	91.5	91	91.5	92	94
LOADS										
R410 refrigerant	C1	kg	38	38	42	47	47	60	70	80
	C2		38	42	42	47	60	60	80	80
Oil	C1	dm^3	6.7+6.7	6.7+6.7	6.7+6.7	7.2+7.2	7.2+7.2	6.7+6.7+6.7	6.7+6.7+6.7	7.2+7.2+7.2
	C2		6.7+6.7	6.7+6.7	6.7+6.7	7.2+7.2	6.7+6.7+6.7	6.7+6.7+6.7	7.2+7.2+7.2	7.2+7.2+7.2
DIMENSIONS - WEIGHTS empty unit										
Height			2450	2450	2450	2450	2450	2450	2450	2450
Width			2200	2200	2200	2200	2200	2200	2200	2200
Depth			3400	3400	3400	4250	4250	4250	5750	5750
Empty weight			2270	2460	2640	2970	3220	3430	3950	4090

Sound power
Aermec determines sound power values on the basis of measurements made in compliance with the 9614-2 Standard, in agreement with that requested by Eurovent certification.

Sound pressure
Sound pressure in free field conditions on reflective surface (directivity factor Q=2) at 10 mt from the external surface of unit, in compliance with ISO 3744 regulations.

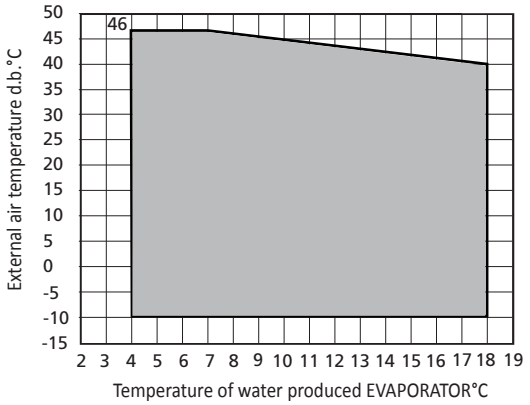
1. **Cooling mode – The 'HE' version is low noise with temperature 12/7°C -35°C**
   Heating mode – The 'HE' version is low noise witth temperature > 25°

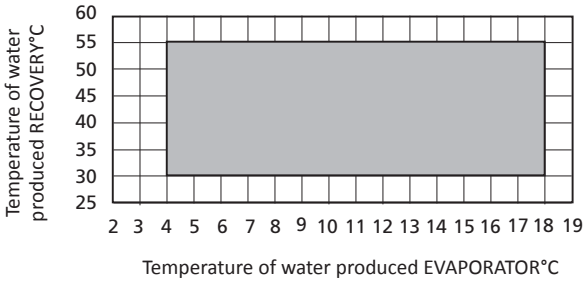
8. OPERATIONAL LIMITS

8.1. COOLING MODE[1]

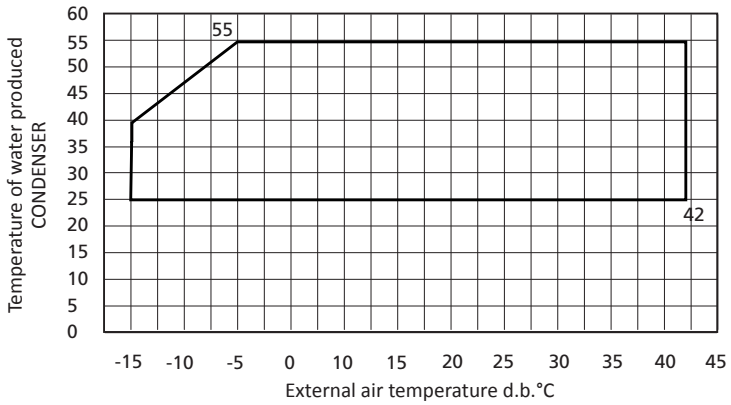
In standard configuration, the appliances are not suitable for installation in salty environments.
For operating limits, please refer to the diagrams, valid for Δt = 5°C.

ATTENTION
The installation of windbreaks is recommended in windy areas, for correct operation of the DCPX. Installation is recommended if wind speed exceeds 2.5 m/s.





8.2. HEATING MODE [1]

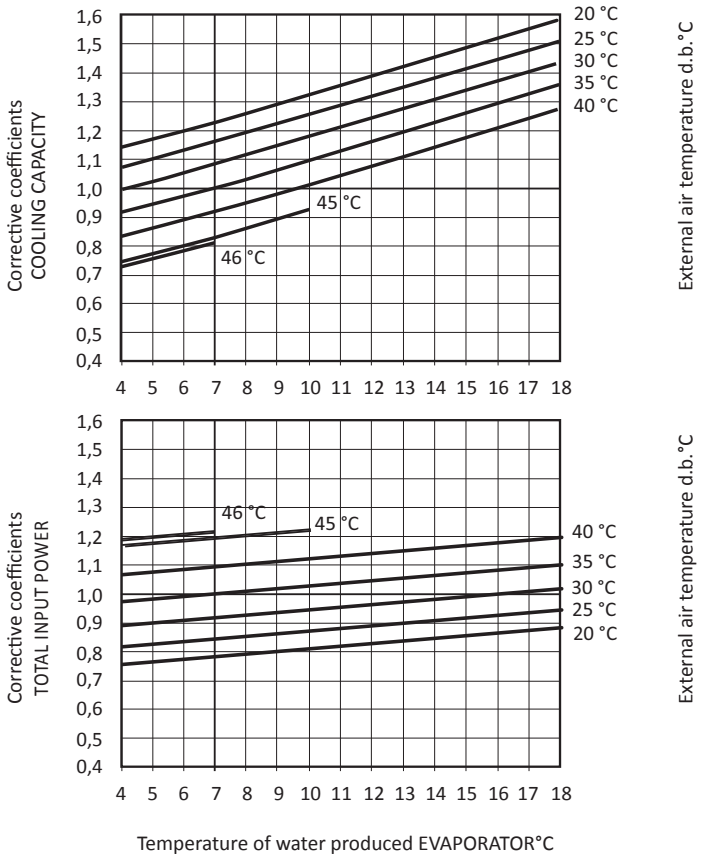


Note:

1 **In SUMMER mode, the unit can be started with external air 46°C and inlet water 35°C.**
In WINTER AND RECOVERY MODE, the unit can be started with external air -15°C and inlet water 20°C.
In these conditions, operation is only allowed for a brief period of time and in order to take the system to the correct temperature.
To shorten this operation, it is recommended to install a three-way valve, which makes it possible to by-pass the water from the utilities to the system, until achieving conditions that allow the unit to work within the allowed operating limits.

9. CORRECTION FACTORS FOR DATA DIFFERENT TO NOMINAL IN COOLING MODE

9.1. YIELDS AND ABSORPTION DIFFERENT TO NOMINAL

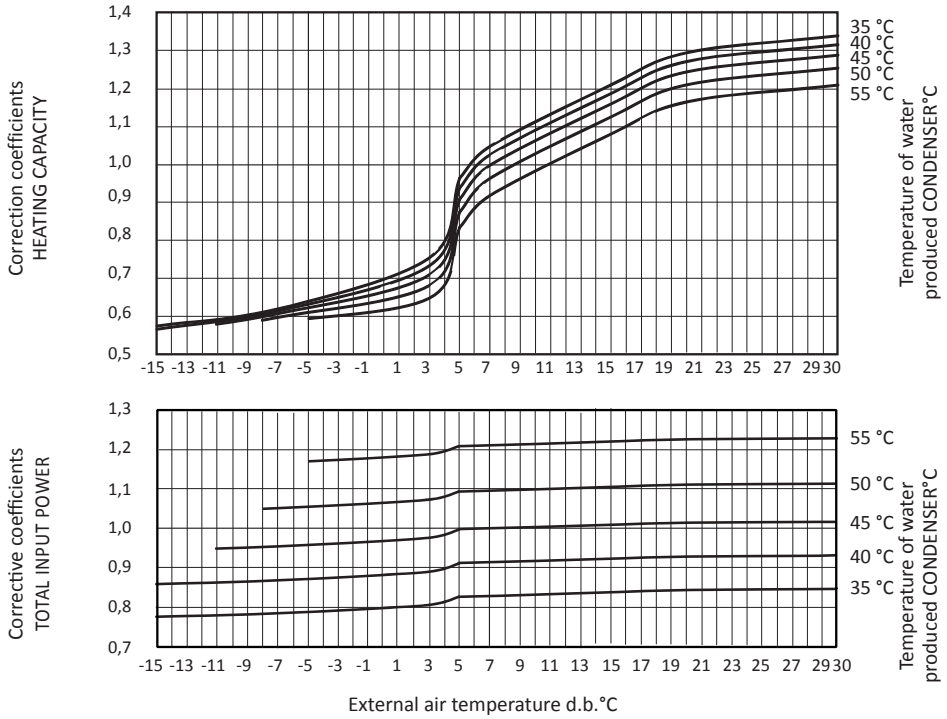


ΔT WATER DIFFERENT TO NOMINAL (ΔT 5°C)	3	5	8	10
Cooling capacity correction factors	0,99	**1**	1,02	1,03
Input power correction factors	0,99	**1**	1,01	1,02

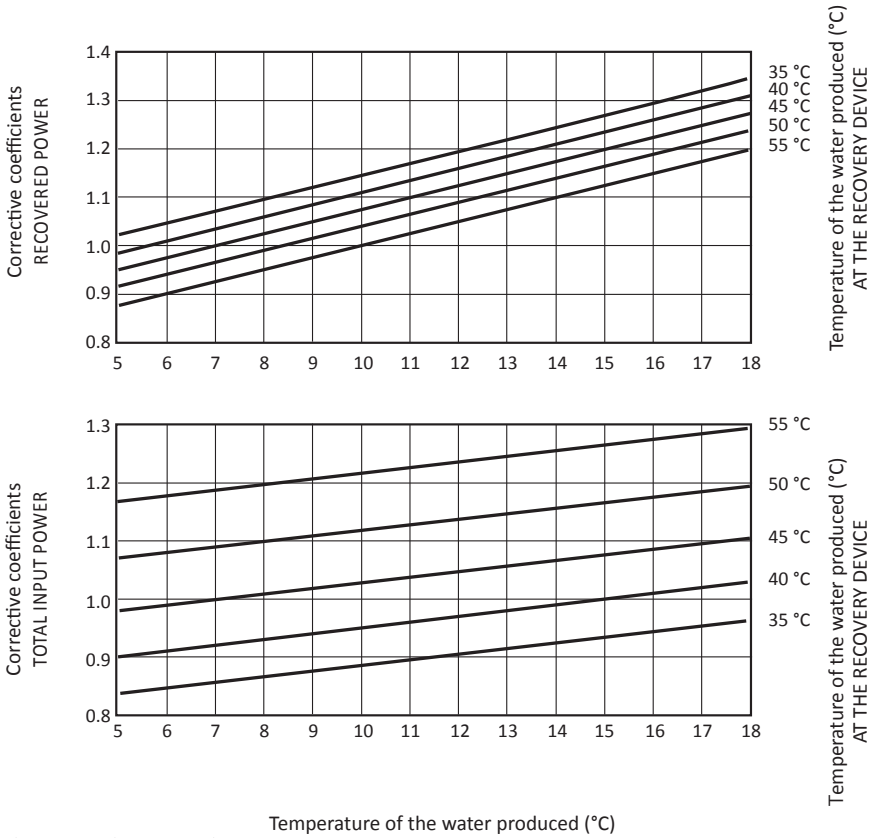
DEPOSIT FACTORS [K*m2]/[W]	0,00005	0,0001	0,0002
Cooling capacity correction factors	**1**	0,98	0,94
Input power correction factors	**1**	0,98	0,95

10. CORRECTION FACTORS FOR DATA DIFFERENT TO NOMINAL IN HEATING MODE

10.1. YIELDS AND ABSORPTION DIFFERENT TO NOMINAL



11. RECOVERED HEATING CAPACITY CORRECTION COEFFICIENTS



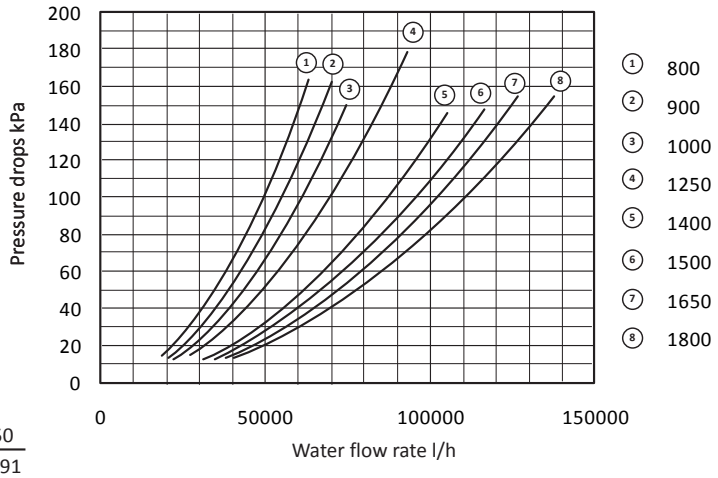
ΔT WATER DIFFERENT TO NOMINAL (ΔT 5°C)	3	5	8	10
Heating capacity correction factors	0,99	**1**	1,01	1,02
Input power correction factors	1,01	**1**	0,98	0,96

12. TOTAL PRESSURE DROPS 2|4 PIPE UNITS

12.1. SYSTEM SIDE COLD WATER PRODUCTION (2 PIPES)

Evaporator inlet water temperature	7°C
Evaporator outlet water temperature	12°C
External air temperature	35 °C
Average water temperature	10° C

For temperatures other than 10°C, use the correction factors table.

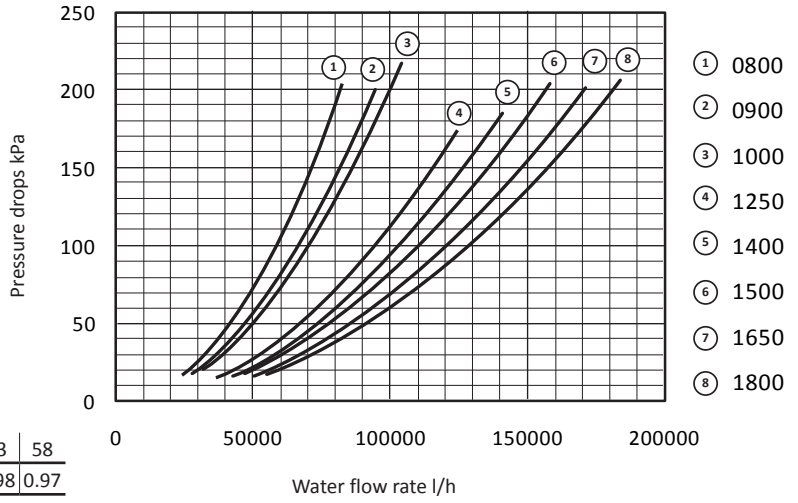


Average water temperature	5	**10**	15	20	30	40	50
Multiplicative coefficient	1.02	**1**	0.98	0.97	0.95	0.93	0.91

12.3. WHEN OPERATING WITH DHW SIDE RECOVERY (2 PIPES) | SYSTEM SIDE HOT WATER PRODUCTION (4 PIPES)

Recovery inlet water temperature	40°C
Recovery outlet water temperature	45°C
Average water temperature	43° C

For temperatures other than 43°C, use the correction factors table



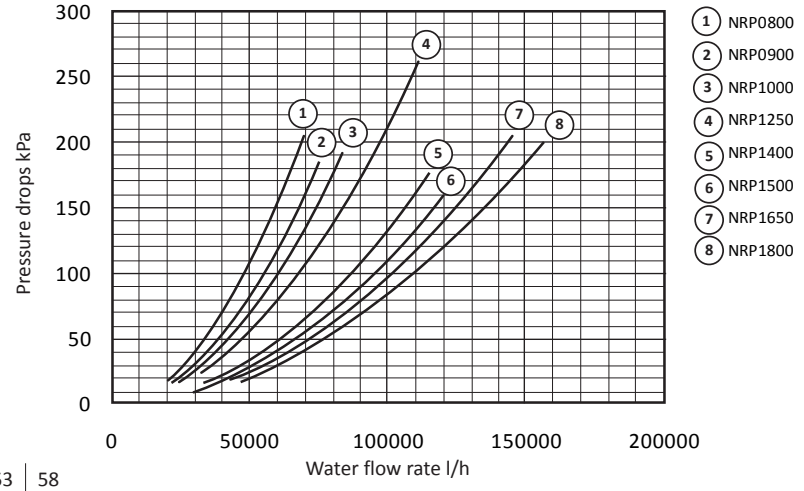
Average water temperature	23	28	33	38	**43**	48	53	58
Multiplicative coefficient	1.04	1.03	1.02	1.01	**1.00**	0.99	0.98	0.97

12.2. SYSTEM SIDE HOT WATER PRODUCTION (2 PIPES)

HEATING FOR 4-PIPE VERSIONS ONLY

Condenser inlet water temperature	40°C
Condenser outlet water temperature	45°C
evaporator air temperature	7°C d.b. 6°C w.b.
Δt water	5°C
Average water temperature	10° C

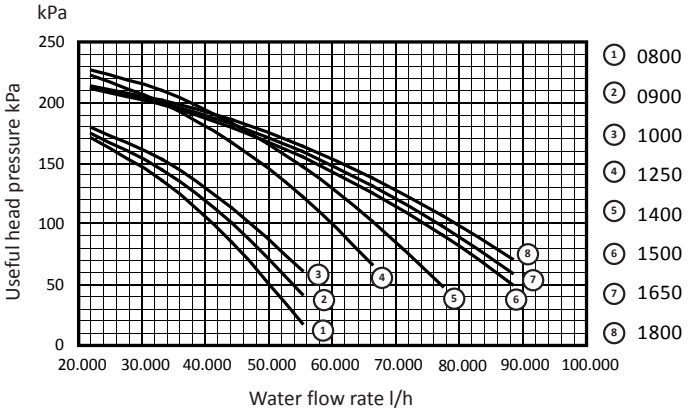
For temperatures other than 43°C, use the correction factors table



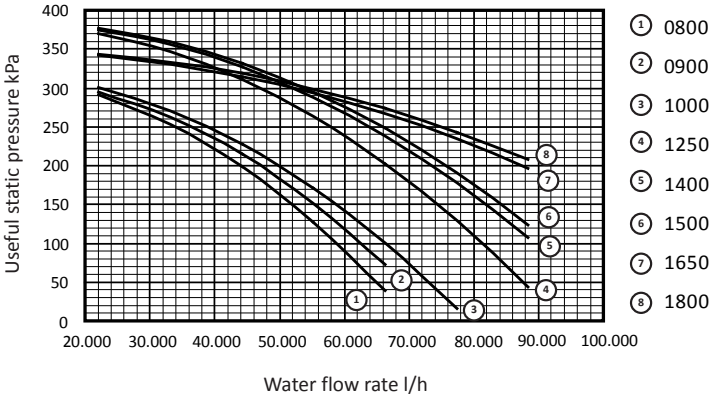
Average water temperature	23	28	33	38	**43**	48	53	58
Multiplicative coefficient	1.04	1.03	1.02	1.01	**1.00**	0.99	0.98	0.97

13. USEFUL HEAD PRESSURES 2|4-PIPE SYSTEM

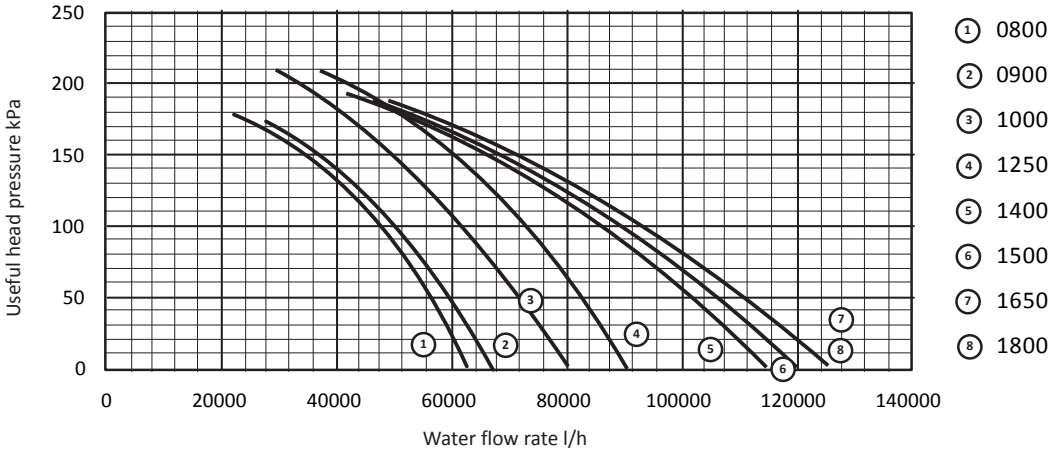
13.1. LOW HEAD PRESSURE IN COOLING MODE (SYSTEM SIDE)



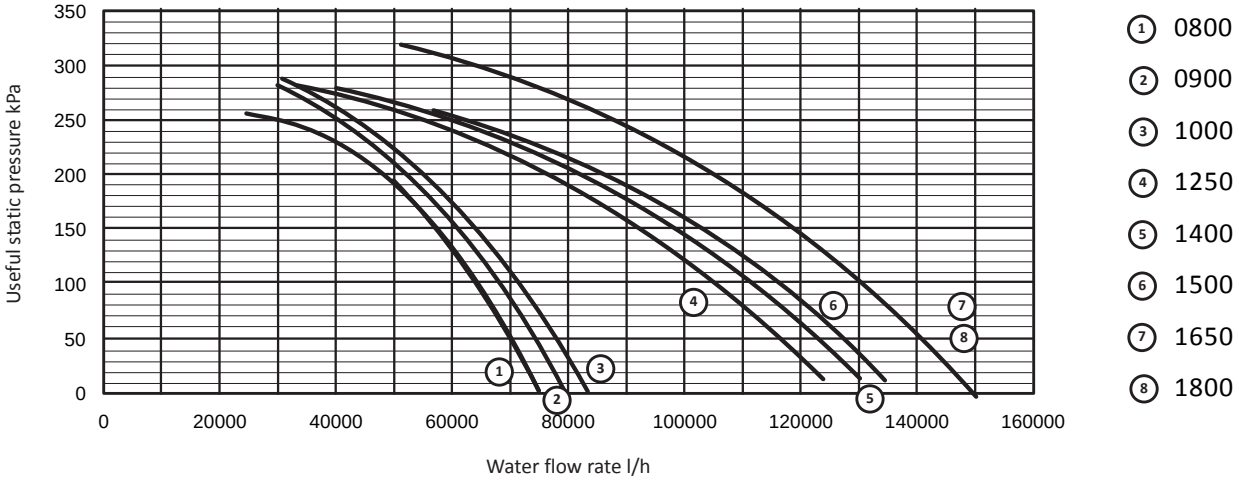
13.2. HIGH HEAD PRESSURE IN COOLING MODE (SYSTEM SIDE)



13.3. DHW SIDE LOW HEAD PRESSURE PUMPS (2 PIPES) | HEATING SIDE (4 PIPES)



13.4. DHW SIDE HIGH HEAD PRESSURE PUMPS (2 PIPES) | HEATING SIDE (4 PIPES)



14. ETHYLENE GLYCOL SOLUTION

- The cooling capacity and input power correction factors take the presence of glycol and the different evaporation temperature into account.
- The pressure drop correction factor considers the different flow rate resulting from the application of the water flow rate correction factor.
- The water flow rate correction factor is calculated in a way to keep the same Δt that would be present with the absence of glycol.

NOTE

An example is given on the next page to help graph reading.

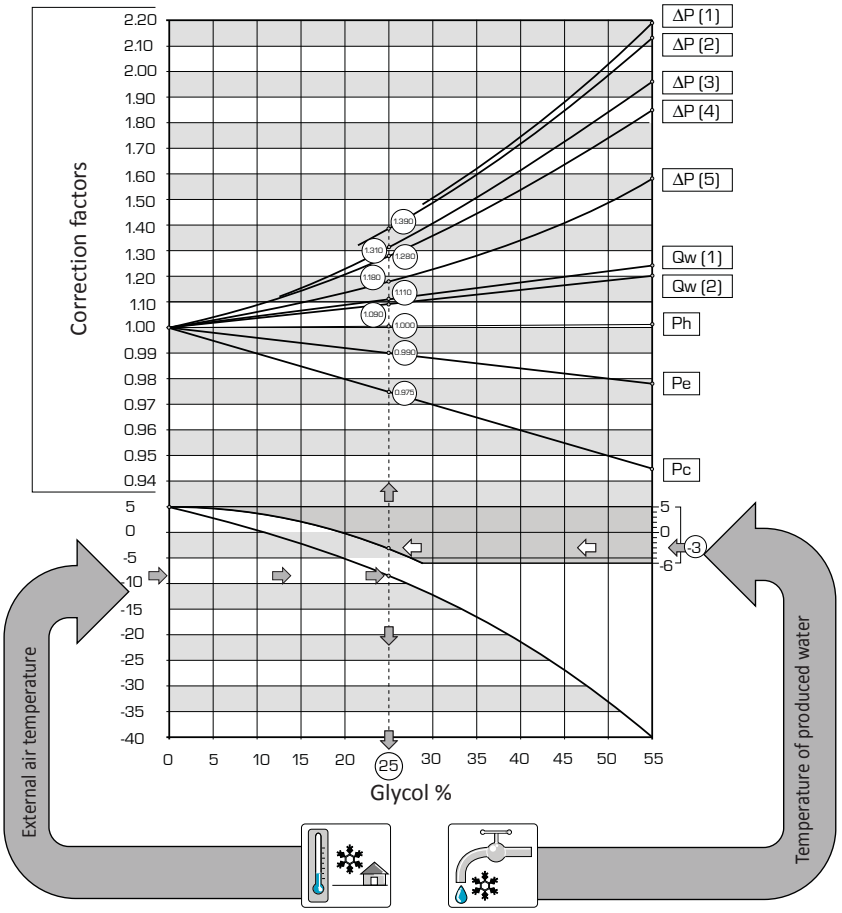
The diagram below can be used to establish the percentage of glycol necessary; this percentage can be calculated by taking one of the following factors into consideration:

Depending on which fluid is considered (water or air), the graph is interpreted from the right or left side. A point is obtained from the intersection point of the external temperature line or the water produced line and the relative curves, through which the vertical line must pass that will identify both the glycol percentage and the relative correction coefficients.

14.1. HOW TO INTERPRET GLYCOL CURVES

The curves shown in the diagram summarise a significant number of data, each of which is represented by a specific curve. In order to use these curves correctly it is first necessary to make some initial reflections:

- If you wish to calculate the percentage of glycol on the basis of the external air temperature, enter from the left axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size in question); while the glycol percentage value recommended to produce desired water temperature is on the lower axis.
- If you wish to calculate the percentage of glycol on the basis of the temperature of the water produced, enter from the right axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size in question); while the lower axis recommends the glycol percentage value necessary to produce water at the desired temperature.
- **Remember that the initial "EXTERNAL AIR TEMPERATURE" and "TEMPERATURE OF PRODUCED WATER" values are not directly related, therefore it is not possible to refer to the curve of one of these values and obtain corresponding point on the other curve.**



KEY:

Pc	Cooling capacity correction factor
Pe	Input power correction factor
Ph	Heating capacity correction factor
ΔP (1)	Correction factor for pressure drops with an average fluid temp. = 3.5 °C
ΔP (2)	Correction factor for pressure drops with an average fluid temp. = 0.5 °C
ΔP (3)	Correction factor for pressure drops with an average fluid temp. = 5.5 °C
ΔP (4)	Correction factor for pressure drops with an average fluid temp. = 9.5 °C
ΔP (5)	Correction factor for pressure drops with an average fluid temp. = 47.5 °C
Qw (1)	Correction factor for flow rates (evap) with an average fluid temp= 9.5 °C
Qw (2)	Correction factor of flow rates (condenser) with an average fluid temp. = 47.5°C

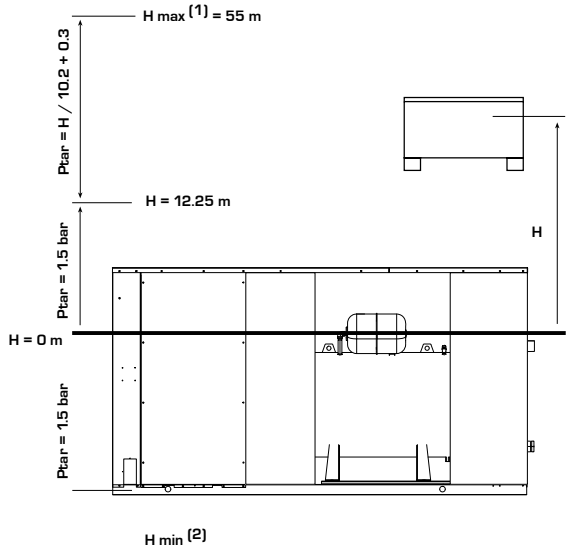
NOTE

Although the graph shows an external air temperature of -40°C, the unit operational limits must be complied with.

15. EXPANSION VESSEL CALIBRATION

14.1.1. Expansion vessel calibration

Standard factory-set pressure value of the expansion vessel is 1.5 bar, whereas volume is 24 litres. Maximum value 6 bar.
Vessel calibration must be regulated depending on the maximum level difference (H) of the user (see diagram) in agreement with the following formula:
p (calibration) [bar] = H [m] / 10.2 + 0.3.
For example: if level difference (H) is equal to 20 m, the calibration value of the vessel will be 2.3 bar.
If the calibration value obtained from formula is less than 1.5 bar (i.e. for H < 12.25), keep standard calibration.



KEY

(1) Check that highest installation is not higher than 55 metres.

(2) Ensure that lowest installation can withstand global pressure in that position.

16. MINIMUM WATER CONTENT

NRP		0800	1000	1250	1400	1500	1650	1800
Number of compressors	n°	4	4	4	4	4	4	4
Minimum water content admitted COLD SIDE		7	7	7	7	7	7	7
Minimum water content admitted the HOT SIDE		7	7	7	7	7	7	7
Recommended water content COOLING SIDE | HEATING SIDE	l/kW	14	14	14	14	14	14	14

ATTENTION
It is recommended to design systems with high water content (minimum recommended values shown in table), in order to limit:
1. The hourly number of inversions between operating modes.
2. Drop in water temperature during winter defrost cycles.

17. PARTIALISATIONS

COOLING

Evaporator inlet water temperature	7°C
Evaporator outlet water temperature	12°C
Condenser air temperature	35 °C
Δt water	5°C

HEATING FOR 4-PIPE VERSIONS ONLY

Condenser inlet water temperature	40°C
Condenser outlet water temperature	45°C
evaporator air temperature	7°C d.b. 6°C w.b.
Δt water	5°C

	Capacity steps					
COOLING CAPACITY %	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
0800	27	53	77	100	-	-
0900	27	53	77	100	-	-
1000	27	53	77	100	-	-
1250	27	53	77	100	-	-
1400	23	44	63	82	100	-
1500	19	37	55	71	86	100
1650	19	37	55	71	86	100
1800	19	37	55	71	86	100
INPUT POWER %	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
0800	23	47	73	100	-	-
0900	23	47	73	100	-	-
1000	23	47	73	100	-	-
1250	23	47	73	100	-	-
1400	18	37	56	77	100	-
1500	14	29	46	63	81	100
1650	14	29	46	63	81	100
1800	14	29	46	63	81	100
HEATING CAPACITY %	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
0800	27	52	77	100	-	-
0900	27	52	77	100	-	-
1000	27	52	77	100	-	-
1250	27	52	77	100	-	-
1400	24	43	62	83	100	-
1500	18	36	53	69	85	100
1650	18	36	53	69	85	100
1800	18	36	53	69	85	100
INPUT POWER %	**1°**	**2°**	**3°**	**4°**	**5°**	**6°**
0800	23	47	73	100	-	-
0900	23	47	73	100	-	-
1000	23	47	73	100	-	-
1250	23	47	73	100	-	-
1400	20	37	56	79	100	-
1500	14	29	46	63	81	100
1650	14	29	46	63	81	100
1800	14	29	46	63	81	100

18. SOUND DATA

ATTENTION
The sound data is calculated with STANDARD fans!

Sound power
Aermec determines sound power values on the basis of measurements made in compliance with the 9614-2 Standard, in agreement with that requested by Eurovent certification.

Sound pressure
Sound pressure in free field conditions with reflective surface (directivity factor Q=2), in compliance with ISO 3744 Standard.

Cooling mode – The 'HE' version is low noise with temperature 12/7°C -35°C
Heating mode – The 'HE' version is low noise witth temperature > 25°

NRP	VERS.	Total sound levels			Octave band [Hz]						
		Pow. dB(A)	Pressure.		125	250	500	1000	2000	4000	8000
			dB(A) 10 m	dB(A) 1 m	Sound power for central band frequency [dB] (A)						
COOLING MODE OPERATION											
0800	**HE**	**83**	**51**	**64.5**	96.5	80	77	75.5	69	65	59
0900	**HE**	**83**	**51**	**64.5**	96.5	80	77	75.5	69	65	59
1000	**HE**	**83,5**	**51.5**	**65**	96	82.7	78.6	74.2	73.3	69.3	65.4
1250	**HE**	**86**	**54**	**67.5**	95.5	88	80.5	79.5	77	70	62
1400	**HE**	**85,5**	**53.5**	**67**	98	83	80.5	79.5	73	64	58
1500	**HE**	**85**	**53**	**66.5**	99	82	79	76	72	63	57
1650	**HE**	**86,5**	**54.5**	**68**	99	84	79.5	80	77	67	62
1800	**HE**	**88,5**	**56.5**	**70**	100	87.5	81.8	83	78.5	69	63.4
0800	**HA**	**88,5**	**56.5**	**70**	99.5	87.5	84.5	83	76.5	72	64
0900	**HA**	**88,5**	**56.5**	**70**	99.5	87.5	84.5	83	76.5	72	64
1000	**HA**	**88,5**	**56.5**	**70**	98	87	84.8	82.9	79.1	75.1	67
1250	**HA**	**91,5**	**59.5**	**73**	99.2	93.5	87.5	85.5	82.2	76	65.2
1400	**HA**	**91**	**59**	**72.5**	101	90	86	87	79	71	64
1500	**HA**	**90,5**	**58.5**	**72**	102	89	86	85	79	71.5	65
1650	**HA**	**92**	**60**	**73.5**	101	92.5	88.5	87	81	73	66
1800	**HA**	**94**	**62**	**75.5**	102	95	90.5	89.5	82	73	67
HEATING MODE OPERATION											
0800	**HE**	**88,5**	**56.5**	**70**	99.5	87.5	84.5	83	76.5	72	64
0900	**HE**	**88,5**	**56.5**	**70**	99.5	87.5	84.5	83	76.5	72	64
1000	**HE**	**88,5**	**56.5**	**70**	98	87	84.8	82.9	79.1	75.1	67
1250	**HE**	**91,5**	**59.5**	**73**	99.2	93.5	87.5	85.5	82.2	76	65.2
1400	**HE**	**91**	**59**	**72.5**	101	90	86	87	79	71	64
1500	**HE**	**90,5**	**58.5**	**72**	102	89	86	85	79	71.5	65
1650	**HE**	**92**	**60**	**73.5**	101	92.5	88.5	87	81	73	66
1800	**HE**	**94**	**62**	**75.5**	102	95	90.5	89.5	82	73	67
0800	**HA**	**88,5**	**56.5**	**70**	99.5	87.5	84.5	83	76.5	72	64
0900	**HA**	**88,5**	**56.5**	**70**	99.5	87.5	84.5	83	76.5	72	64
1000	**HA**	**88,5**	**56.5**	**70**	98	87	84.8	82.9	79.1	75.1	67
1250	**HA**	**91,5**	**59.5**	**73**	99.2	93.5	87.5	85.5	82.2	76	65.2
1400	**HA**	**91**	**59**	**72.5**	101	90	86	87	79	71	64
1500	**HA**	**90,5**	**58.5**	**72**	102	89	86	85	79	71.5	65
1650	**HA**	**92**	**60**	**73.5**	101	92.5	88.5	87	81	73	66
1800	**HA**	**94**	**62**	**75.5**	102	95	90.5	89.5	82	73	67

19. CALIBRATIONS OF SAFETY AND CONTROL PARAMETERS

COOLING SET	min	Max.	default
Water inlet temperature (cooling mode)	-10 °C	20 °C	7° C

HEATING SET			
Water inlet temperature (heating mode)	45°C	55 °C	50 °C

ANTI-FREEZE ALARM INTERVENTION			
Intervention temperature on EVAPORATOR side	-15 °C	4 °C	3 °C

TOTAL DIFFERENTIAL			
Proportional temperature band within which the compressors are activated and deactivated	3 °C	10 °C	5 °C

COMPRESSORS MAGNET CIRCUIT BREAKERS		0800	0900	1000	1250	1400	1500	1650	1800
MTC1	A	40	40	51	62	62	51	51	62
MTC1A	A	40	40	51	62	62	51	51	62
MTC1B	A	-	-	-	-	-	51	51	62
MTC2	A	40	51	51	62	51	51	62	62
MTC2A	A	40	51	51	62	51	51	62	62
MTC2B	A	-	-	-	-	51	51	62	62
MANUAL RESET HIGH PRESSURE SWITCH									
PA	bar	40	40	40	40	40	40	40	40
HIGH PRESSURE TRANSDUCER									
TAP	bar	39	39	39	39	39	39	39	39
LOW PRESSURE TRANSDUCER									
TBP	bar	2	2	2	2	2	2	2	2
COOLING CIRCUIT SAFETY VALVES									
HP	bar	45	45	45	45	45	45	45	45
LP	bar	30	30	30	30	30	30	30	30
FANS MAGNET-CIRCUIT BREAKERS - Calibration is performed on 2 magnet-circuit breakers (2 ventilation lines)									
	A	9	9	9	14	14	14	18	18

Standards complied with WHEN DESIGNING and CONSTRUCTING the unit:
SAFETY

1. Machinery directive 2006/42/EC
2. Low voltage directive LVD 2006/95/EC
3. Electromagnetic compatibility directive EMC 2004/108/EC
4. Directive regarding pressurised devices PED 97/23/EC, EN 378,
5. UNI12735, UNI14276

ELECTRIC PART

1. IEC EN 60335-2-40,
2. IEC EN 61000-6-1/2/3/4

ACOUSTIC PART

1. ISO DIS 9614/2 (intensimetric method)

PROTECTION RATING
IP24

REFRIGERANT GAS
This unit contains fluoride gases with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must only be performed by qualified staff, in compliance with standards in force.

ATTENTION
Tampering, removal, lack of the identification plate or other does not allow the safe identification of the product and will make any installation or maintenance operation to be performed difficult.

20. GENERAL WARNINGS

AERMEC NRP heat pumps are manufactured according to the acknowledged technical standards and safety regulations. They are designed for summer and winter conditioning and the production of domestic hot water. Any contractual or extracontractual liability of the Company is excluded for injury/damage to persons, animals or objects owing to installation, regulation and maintenance errors or improper use. All uses not expressly indicated in this manual are prohibited.

20.1. PRESERVATION OF THE DOCUMENTATION

The instructions and all related documentation must be given to the user of the system, who is responsible for preserving the same so that they are always on hand when required.
Read this file carefully; the execution of all jobs must be performed by qualified staff, according to the Standards in force on this subject in the different countries (Ministerial Decree 329/2004).

20.2. INSTALLATION

The unit must be installed in a way that maintenance and/or repairs can be carried out.

20.3. WARRANTY

The appliance warranty does not cover the costs for ladders, scaffolding or other elevation systems, which may become necessary for carrying out interventions under warranty.
Do not modify or tamper with the heat pump as dangerous situations can be created and the manufacturer will not be liable for any damage caused. The warranty shall be become null and void if the above-mentioned indications are not respected.

20.4. WARNINGS REGARDING SAFETY AND INSTALLATION STANDARDS

The heat pump must be installed by a qualified and suitably trained technician, in compliance with the national legislation in force in the country of destination (Ministerial Decree 329/2004).
AERMEC will not assume any liability for damage if these instructions are not respected.

Before beginning any operation, ***READ THESE INSTRUCTIONS CAREFULLY AND CARRY OUT THE SAFETY CHECKS TO AVOID ALL RISKS.***
All the staff involved must have thorough knowledge of the operations and any dangers that may arise when the unit installation operations are carried out.

21. PRODUCT IDENTIFICATION

The NRP multipurpose appliances can be identified through:
PACKING LABEL
which shows the product identification data.

TECHNICAL PLATE

22. RECEIPT OF THE PRODUCT AND INSTALLATION

22.1. RECEIPT AND HANDLING

The machine is delivered from the factory wrapped in estincoil.
Before handling the unit, verify the lifting capacity of the machines used.
Handling must be performed by qualified, suitably equipped staff.

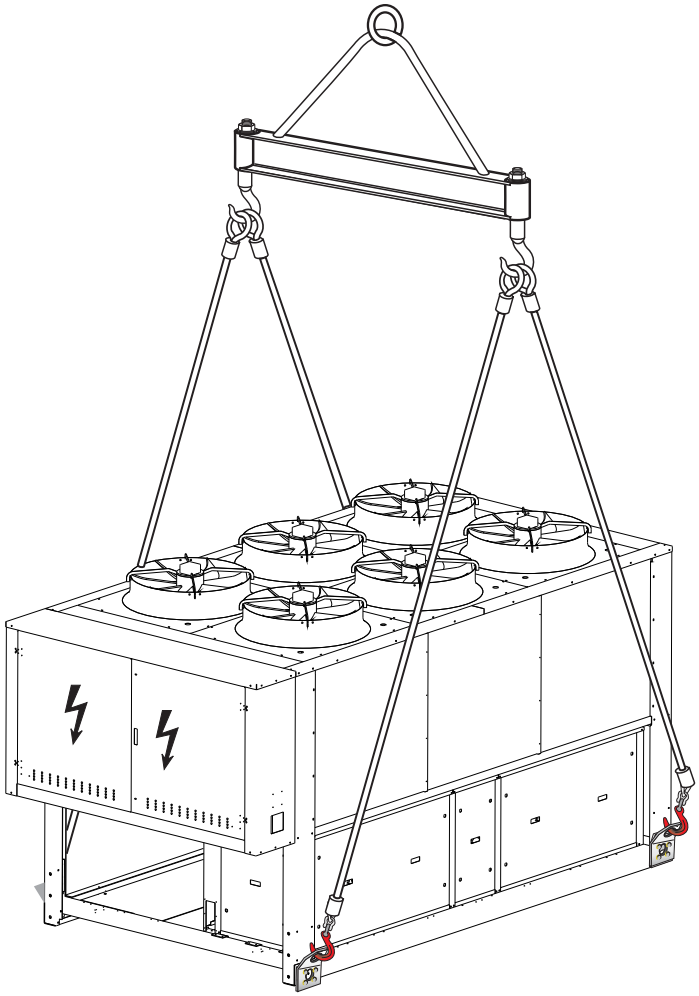
22.2. HANDLING THE MACHINE:

Whenever the machine must be lifted using belts, place protections between the belts and the framework to prevent damage to the structure.
NRP 0800-1800 units are supplied with eyebolts; they must be lifted using suitable belts hooked to all the installed eyebolts.

22.2.1. Lifting regulations

1. All panels must be tightly fixed before handling the unit;
2. Before lifting, check the specific weight on the technical plate;
3. Use all, and only, the lifting points indicated;
4. Use ropes in compliance with Standards and of equal length;
5. Use a spacer beam in compliance with Standards (not included);
6. Handle the unit with care and without sudden movements

It is prohibited to stop under the unit during lifting operations.
- **The machine must always be kept in a vertical position;**
- **ATTENTION: The units CANNOT be stacked.**



22.3. SELECTION AND PLACE OF INSTALLATION

The NRP air/water OUTDOOR heat pump with gas side inversion (R410A) is sent from the factory already inspected and only requires electric and hydraulic connections in the place of installation.
Before beginning the installation process, decide with the customer where the unit is to be installed, whilst paying attention to the following:

1. The support surface must be capable of supporting the unit weight.
2. The safety distances between the units and other appliances or structures must be scrupulously respected.
3. The unit must be installed by a qualified technician in compliance with national laws in the country of destination.
4. It is mandatory to envision the necessary technical spaces in order to allow ROUTINE AND EXTRAORDINARY MAINTENANCE interventions.
5. Remember that during operation, the chiller can cause vibrations; therefore "AVX" anti-vibration mounts (ACCESSORIES) are recommended, which are fixed to the base according to the assembly layout.
6. Fix the unit checking that it is level.

23. WEIGHTS AND BARYCENTRES

TAB.1

WEIGHT OF UNITS WHEN EMPTY

NRP	HYDRONIC KIT	UNIT WEIGHT (KG)	BARYCENTRE (mm)		WEIGHT DISTRIBUTION ON SUPPORTS (%)								AVX KIT
			Gx	Gy	A	B	C	D	E	F	G	H	
0800	00	2270	1331	821	11.2%	18.8%	19.5%	32.7%	6.7%	11.2%	-	-	704
0900	00	2460	1374	794	10.1%	17.9%	19.1%	33.8%	6.9%	12.2%	-	-	710
1000	00	2640	1354	793	10.2%	18.1%	19.4%	34.4%	6.5%	11.5%	-	-	716
1250	00	2970	1748	796	10.5%	18.5%	18.7%	33.1%	7.0%	12.3%	-	-	719
1400	00	3220	1789	907	10.9%	15.6%	22.4%	32.0%	7.8%	11.2%	-	-	725
1500	00	3430	1772	771	8.9%	16.6%	20.1%	37.3%	6.0%	11.1%	-	-	730
1650	00	3950	2504	792	8.4%	15.0%	11.7%	20.7%	9.8%	17.5%	6.1%	10.8%	734
1800	00	4090	2502	807	8.5%	14.7%	12.1%	20.9%	9.9%	17.0%	6.2%	10.7%	737

TAB.2 **WEIGHTS of the individual HYDRONIC KITS [1]**

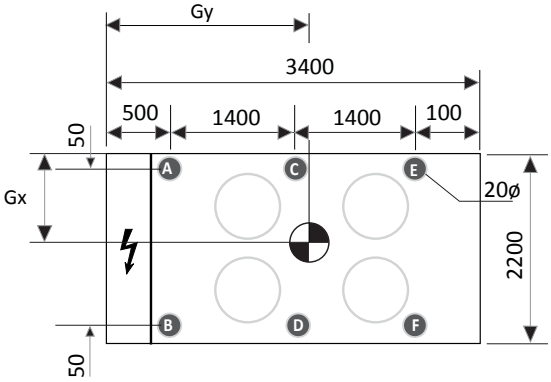
HYDRONIC KIT	P1	P2	P3	P4	R1	R2	R3	R4	AVX [2]
0800	221	271	251	291	221	271	251	291	706
0900	223	263	253	283	223	263	253	283	712
1000	221	261	251	281	221	261	251	281	712
1250	232	282	262	302	232	282	262	302	721
1400	223	263	253	283	223	263	253	283	727
1500	248	318	248	278	248	318	248	278	732
1650	253	323	283	343	253	323	283	343	736
1800	243	313	273	333	243	313	273	333	736

ATTENTION

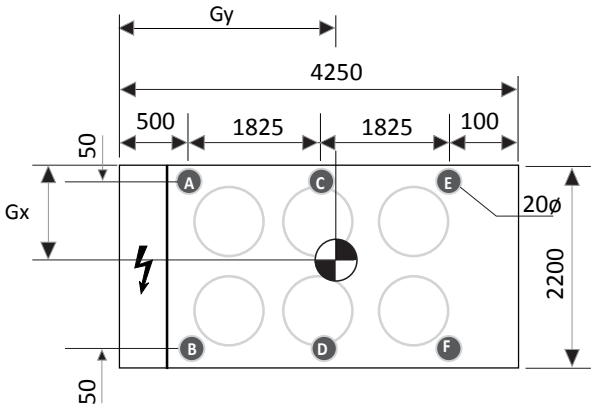
1. The weight of the hydronic kits does not affect the barycentre and the distribution of the % weight on the supports **refer to the "00" versions without hydronic kit, see TAB 1.**
2. The **AVX** listed by size in **TAB.2** can also be coupled in all possible combinations between the: SYSTEM/DHW COOLING/HEATING side hydronic kits

VIEWS FROM ABOVE

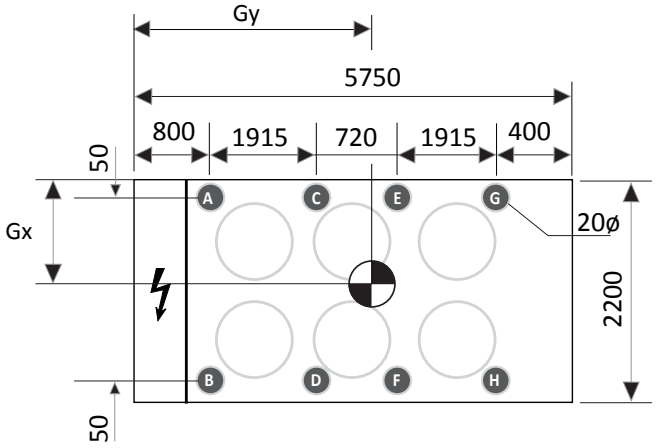
NRP 0800 - 0900 - 1000



NRP 1250 - 1400 - 1500



NRP 1650 - 1800

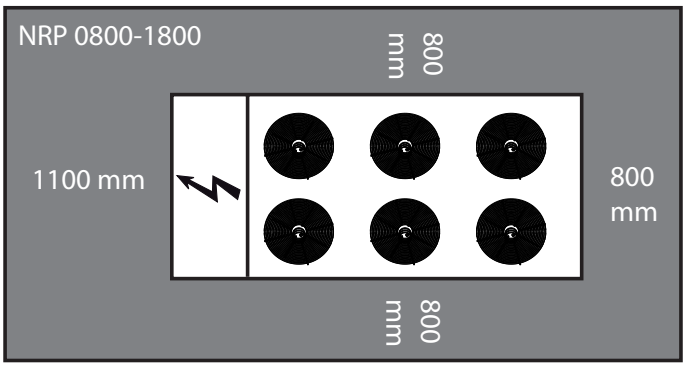


NRP 0800-1000	POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS recovery hydronic unit					
system hydronic unit		SDgr	R1	R2	R3	R4
	SDgr	ok	ok	na	ok	na
	P1	ok	ok	na	ok	na
	P2	ok	ok	na	ok	na
	P3	ok	ok	na	ok	na
	P4	ok	ok	na	ok	na

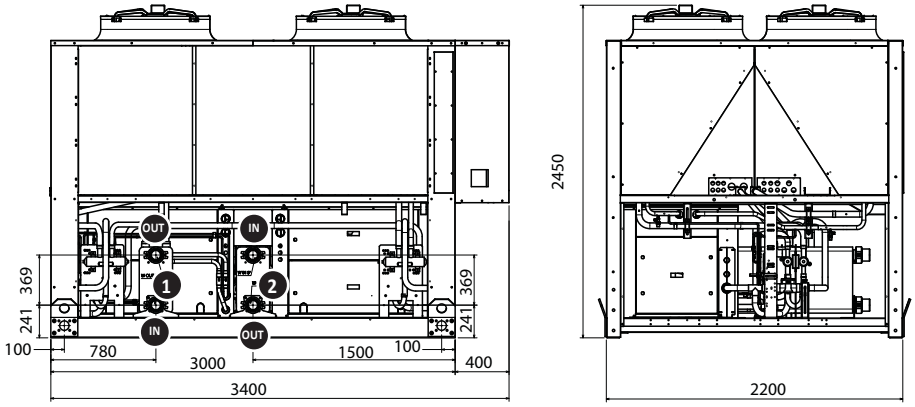
NRP 1250-1800	POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS recovery hydronic unit					
system hydronic unit		SDgr	R1	R2	R3	R4
	SDgr	ok	ok	ok	ok	ok
	P1	ok	ok	ok	ok	ok
	P2	ok	ok	ok	ok	ok
	P3	ok	ok	ok	ok	ok
	P4	ok	ok	ok	ok	ok

24. DIMENSIONS | HYDRAULIC CONNECTIONS

24.1. NRP0800 ÷ 1000 MINIMUM TECHNICAL SPACES

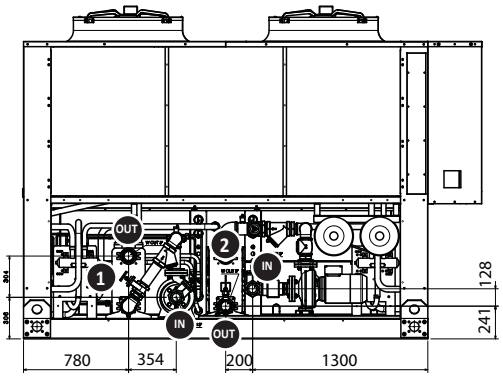


24.3. NRP0800 ÷ 1000 HYDRAULIC CONNECTIONS POSITION vers. 00



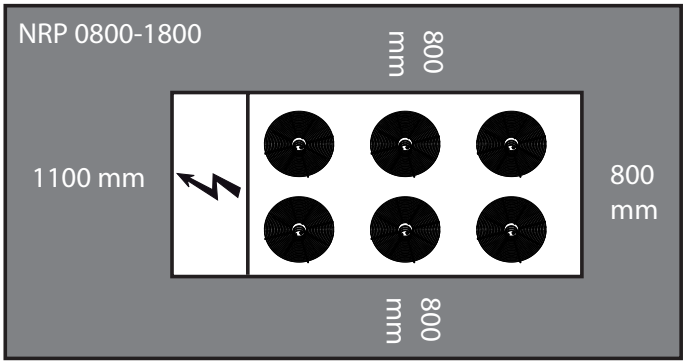
1 **DHW side /heating system side exchanger**
Ø 3" VICTAULIC CONNECTIONS
2 **Cooling and heating system side exchanger**
Ø 3" VICTAULIC CONNECTIONS

24.2. NRP0800 ÷ 1000 HYDRAULIC CONNECTIONS POSITION vers. P1...P4|R1...R4

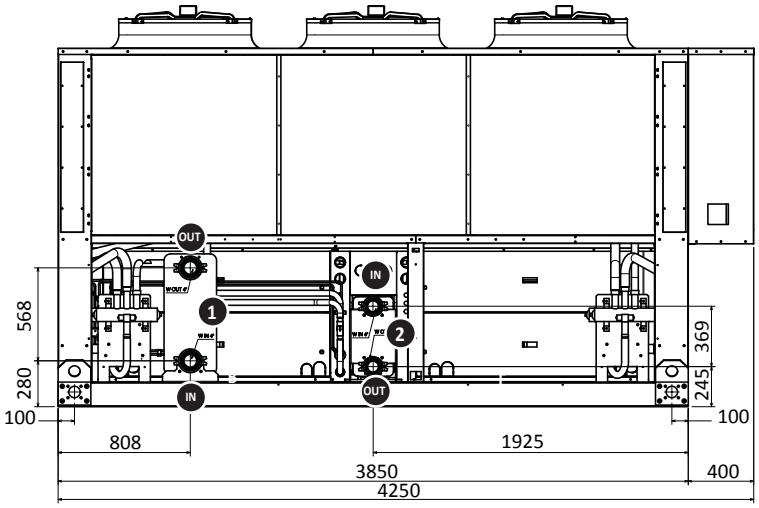


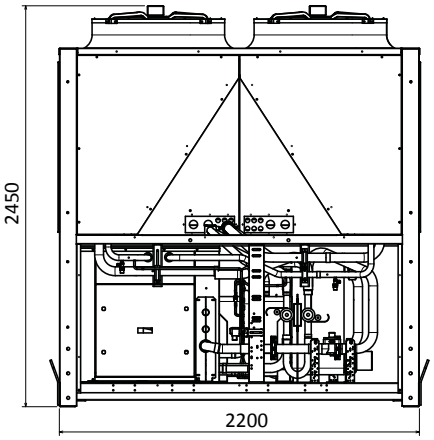
1 **DHW side / heating system side pumps unit**
Ø 3" VICTAULIC CONNECTIONS
2 **Coling / heating system side pumps unit**
Ø 3" VICTAULIC CONNECTIONS

24.4. NRP 1250 MINIMUM TECHNICAL SPACES



24.5. NRP 1250 HYDRAULIC CONNECTIONS POSITION vers. 00

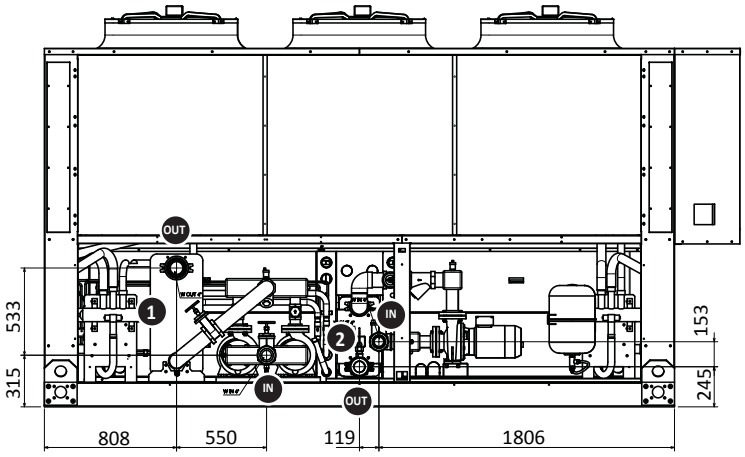




1 **DHW side /heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS

2 **Cooling and heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS

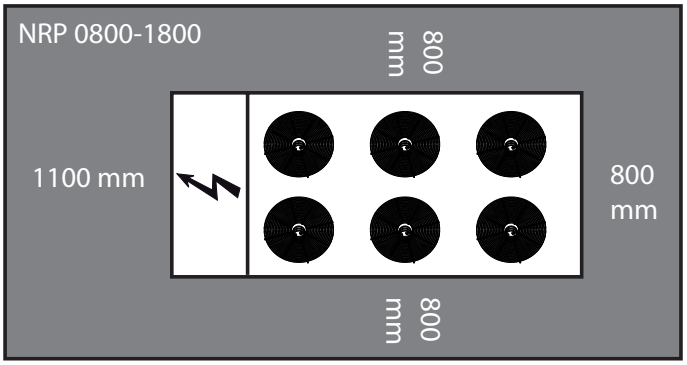
24.6. NRP 1250 HYDRAULIC CONNECTIONS POSITION vers. P1...P4|R1...R4



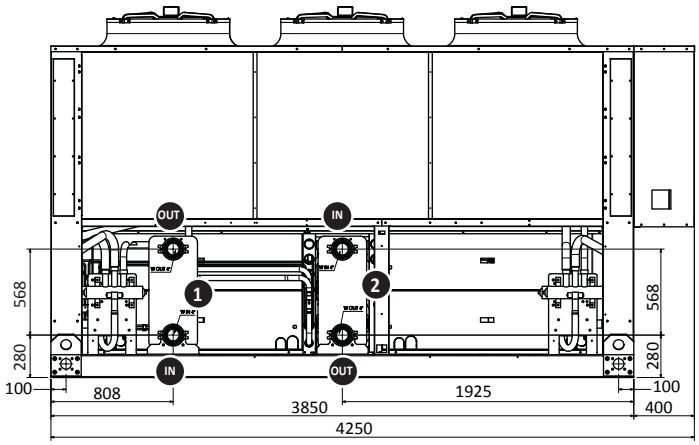
1 **DHW side / heating system side pumps unit**
Ø 4" VICTAULIC CONNECTIONS

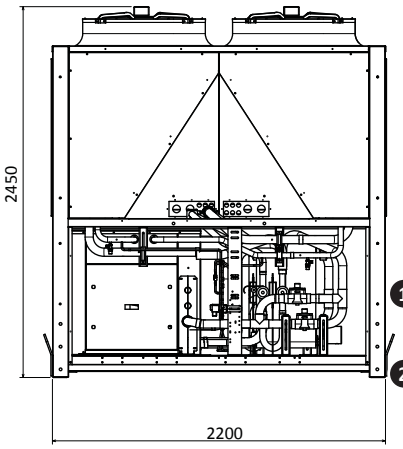
2 **Coling / heating system side pumps unit**
Ø 4" VICTAULIC CONNECTIONS

24.7. NRP 1400 - 1500 MINIMUM TECHNICAL SPACES



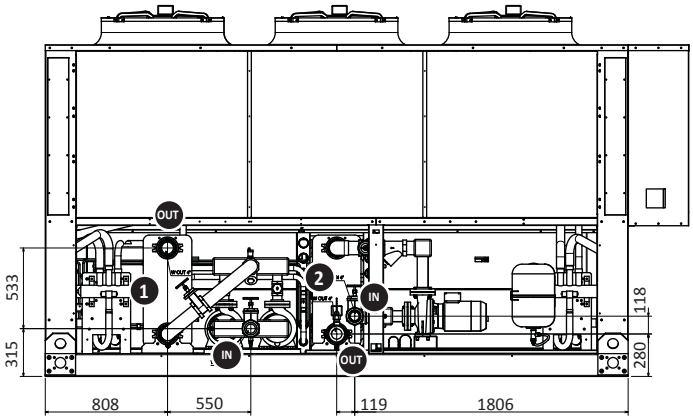
24.8. NRP 1400 - 1500 HYDRAULIC CONNECTIONS POSITION vers. 00





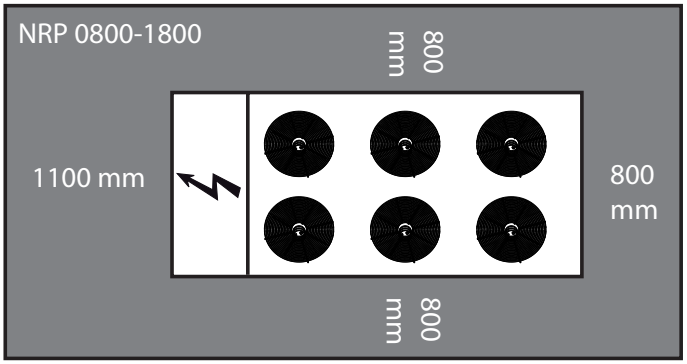
1 **DHW side /heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS
2 **Cooling and heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS

24.9. NRP 1400 - 1500 HYDRAULIC CONNECTIONS POSITION vers. P1...P4|R1...R4

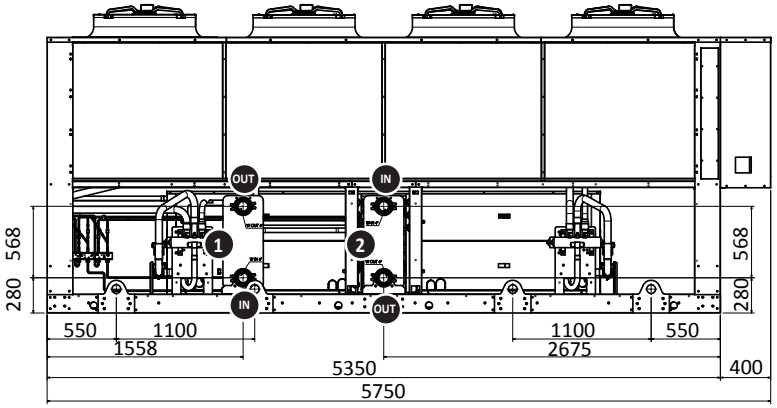


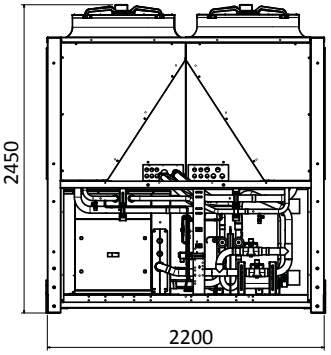
1 **DHW side / heating system side pumps unit**
Ø 4" VICTAULIC CONNECTIONS
2 **Coling / heating system side pumps unit**
Ø 4" VICTAULIC CONNECTIONS

24.10. NRP 1650 - 1800 MINIMUM TECHNICAL SPACES



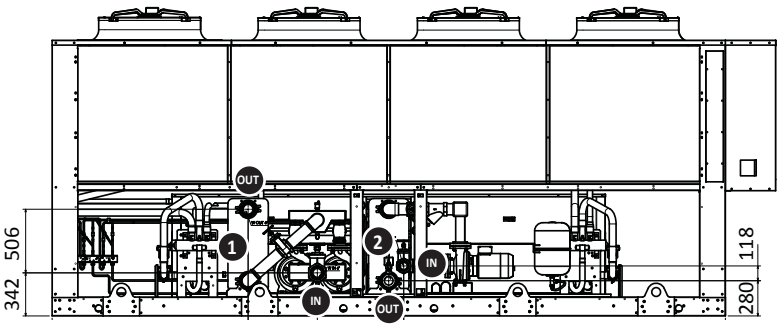
24.11. NRP 1650 - 1800 HYDRAULIC CONNECTIONS POSITION vers. 00





1 **DHW side /heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS
2 **Cooling and heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS

24.12. NRP 1650 - 1800 HYDRAULIC CONNECTIONS POSITION vers. P1...P4|R1...R4

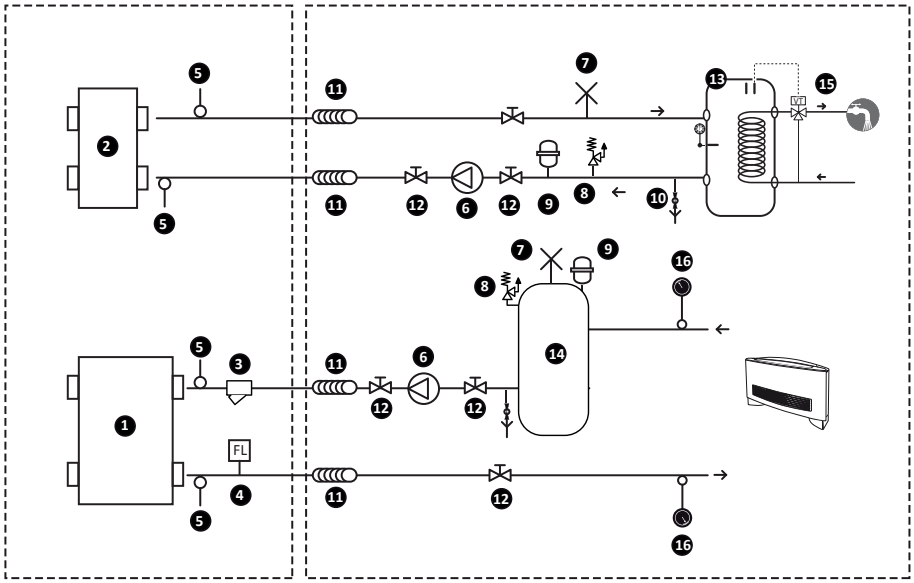


1 **DHW side /heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS
2 **Cooling and heating system side exchanger**
Ø 4" VICTAULIC CONNECTIONS

25. BASIC 2-PIPE SYSTEM HYDRAULIC CIRCUITS

25.1. HYDRAULIC CIRCUIT INSIDE AND OUTSIDE "00" VERSION NRP

NRP HYDRAULIC COMPONENTS | **HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT**



	STANDARD NRP COMPONENTS FOR 2-PIPE SYSTEMS SUPPLIED AS PER STANDARD
1	Plate heat exchanger (SYSTEM SIDE)
2	Total recovery (DHW SIDE)
3	Water filter (supplied)
4	Flow switch (mounted)
5	Water temperature probes (IN/OUT)

	RECOMMENDED COMPONENTS NOT SUPPLIED FOR WHICH INSTALLER IS RESPONSIBLE
6	Pumps
7	Air vent valve
8	Safety valve
9	Expansion vessel
10	Drain cock
11	Anti-vibration joints
12	Cut-off cocks
13	Domestic hot water storage tank (DHW)
14	System water storage tank **(respect the minimum water content, see TAB 3 or in the event of low loads envision use to prevent continuous ON/OFF of the compressors)**
15	Thermostatic valve
16	Manometer

TAB 3		0800	1000	1250	1400	1500	1650	1800
Number of compressors	n°	4	4	4	4	4	4	4
Minimum water content admitted COLD SIDE		7	7	7	7	7	7	7
Minimum water content admitted the HOT SIDE		7	7	7	7	7	7	7
Recommended water content COOLING SIDE | HEATING SIDE	l/kW	14	14	14	14	14	14	14

WATER FEATURES

PH	**6-8**
Electric conductivity	Less than 200 mV/cm (25°C)
Chloride ions	Less than 50 ppm
Sulphuric acid ions	Less than 50 ppm
Total iron	Less than 0.3 ppm
Alkalinity M	Less than 50 ppm
Total hardness	Less than 50 ppm
Sulphur ions	none
Ammonia ions	None
Silicone ions	Less than 30 ppm

ATTENTION
The choice and installation of components outside the NRP unit is the installer's responsibility, who must operate according to the code of practice and in compliance with the Standard in force in the country of destination.

ATTENTION
The hydraulic connection pipes to the machine must be suitably dimensioned for the effective water flow rate requested by the system when running. The water flow rate to the heat exchanger must always be constant.

ATTENTION
Wash the system thoroughly before connecting the unit. This cleaning operation will eliminate any residues such as welding drips, scale, rust, or other impurities from the piping. These substances can also deposit inside and cause machine malfunctioning. The connection piping must be adequately supported so that its weight is not borne by the appliance.

ATTENTION
An appropriate load/reintegration system must be prepared, which is engaged on the return line, along with a drain cock in the lowest part of the system. Water disconnectors must be used in systems loaded with anti-freeze or where particular legal provisions apply.

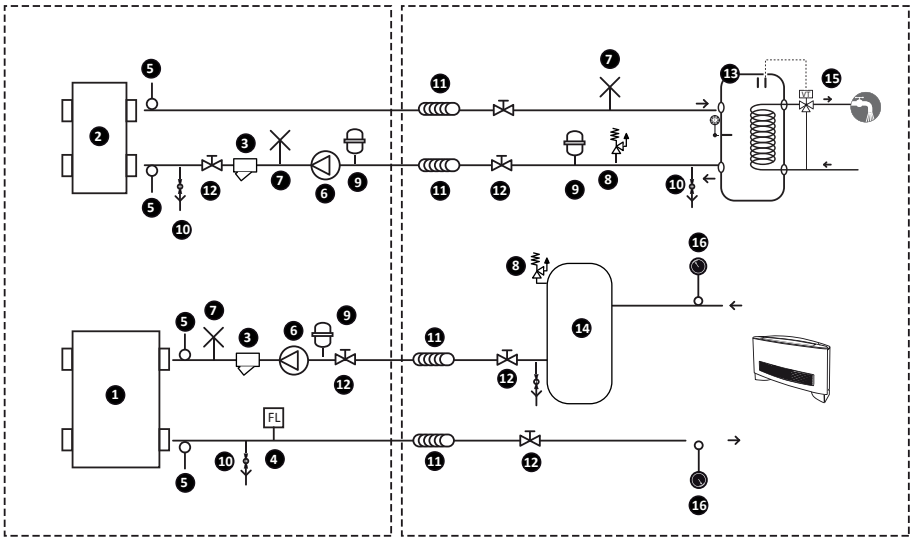
Particular supply/reintegration waters must be conditioned with appropriate treatment systems. The **"water features"** provided in the table can be used as a reference.

ATTENTION
It is prohibited to release water-glycol mixtures into the environment.

ATTENTION
It is recommended to design systems with high water content (minimum recommended values shown in **TAB 3**), in order to limit:
1. The hourly number of inversions between operating modes.
2. Drop in water temperature during winter defrost cycles.

25.2. HYDRAULIC CIRCUIT INSIDE AND OUTSIDE NRP VERSION "WITH P1...P4|R1...R4 PUMPS"

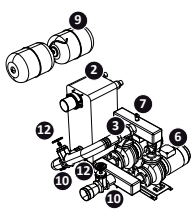
NRP HYDRAULIC COMPONENTS | **HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT**



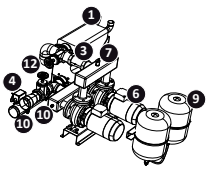
	STANDARD NRP COMPONENTS FOR 2-PIPE SYSTEMS SUPPLIED AS PER STANDARD
1	Plate heat exchanger (SYSTEM SIDE)
2	Total recovery (DHW SIDE)
3	Water filter (mounted)
4	Flow switch (mounted)
5	Water temperature probes (IN/OUT)
6	Pump
7	Air vent valve
9	Expansion vessel
10	Drain cock
12	Cut-off cocks

	RECOMMENDED COMPONENTS NOT SUPPLIED FOR WHICH INSTALLER IS RESPONSIBLE
8	Safety valve
11	Anti-vibration joints
13	Domestic hot water storage tank (DHW)
14	System water storage tank **(respect the minimum water content, see TAB 3 or in the event of low loads envision use to prevent continuous ON/OFF of the compressors)**
15	Thermostatic valve
16	Manometer

TAB 3		0800	1000	1250	1400	1500	1650	1800
Number of compressors	n°	4	4	4	4	4	4	4
Minimum water content admitted COLD SIDE		7	7	7	7	7	7	7
Minimum water content admitted the HOT SIDE		7	7	7	7	7	7	7
Recommended water content COOLING SIDE | HEATING SIDE	l/kW	14	14	14	14	14	14	14



DHW SIDE



SYSTEM SIDE

WATER FEATURES

PH	**6-8**
Electric conductivity	Less than 200 mV/cm (25°C)
Chloride ions	Less than 50 ppm
Sulphuric acid ions	Less than 50 ppm
Total iron	Less than 0.3 ppm
Alkalinity M	Less than 50 ppm
Total hardness	Less than 50 ppm
Sulphur ions	none
Ammonia ions	None
Silicone ions	Less than 30 ppm

ATTENTION
The choice and installation of components outside the NRP unit is the installer's responsibility, who must operate according to the code of practice and in compliance with the Standard in force in the country of destination.

ATTENTION
The hydraulic connection pipes to the machine must be suitably dimensioned for the effective water flow rate requested by the system when running. The water flow rate to the heat exchanger must always be constant.

ATTENTION
Wash the system thoroughly before connecting the unit. This cleaning operation will eliminate any residues such as welding drips, scale, rust, or other impurities from the piping. These substances can also deposit inside and cause machine malfunctioning. The connection piping must be adequately supported so that its weight is not borne by the appliance.

ATTENTION
An appropriate load/reintegration system must be prepared, which is engaged on the return line, along with a drain cock in the lowest part of the system. Water disconnectors must be used in systems loaded with anti-freeze or where particular legal provisions apply.

Particular supply/reintegration waters must be conditioned with appropriate treatment systems. The **"water features"** provided in the table can be used as a reference.

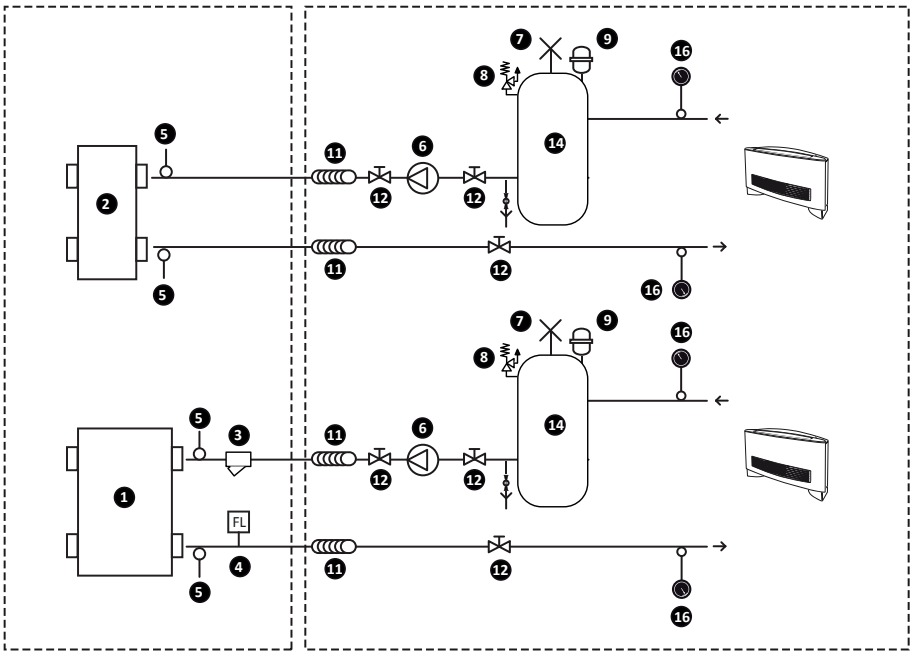
ATTENTION
It is prohibited to release water-glycol mixtures into the environment.

ATTENTION
It is recommended to design systems with high water content (minimum recommended values shown in **TAB 3**), in order to limit:
1. The hourly number of inversions between operating modes.
2. Drop in water temperature during winter defrost cycles.

26. BASIC 4-PIPE SYSTEM HYDRAULIC CIRCUITS

26.1. INTERNAL AND EXTERNAL HYDRAULIC CIRCUIT TO NRP "00"

NRP HYDRAULIC COMPONENTS | **HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT**



	STANDARD NRP COMPONENTS FOR 4-PIPE SYSTEMS SUPPLIED AS PER STANDARD
1	Plate heat exchanger (COLD WATER PRODUCTION SYSTEM SIDE)
2	Plate heat exchanger (HOT WATER PRODUCTION SYSTEM SIDE)
3	Water filter (supplied)
4	Flow switch (mounted)
5	Water temperature probes (IN/OUT)

	RECOMMENDED COMPONENTS NOT SUPPLIED FOR WHICH INSTALLER IS RESPONSIBLE
6	Pumps
7	Air vent valve
8	Safety valve
9	Expansion vessel
10	Drain cock
11	Anti-vibration joints
12	Cut-off cocks
13	Domestic hot water storage tank (DHW)
14	System water storage tank **(respect the minimum water content, see TAB 3 or in the event of low loads envision use to prevent continuous ON/OFF of the compressors)**
15	Thermostatic valve
16	Manometer

TAB 3		0800	1000	1250	1400	1500	1650	1800
Number of compressors	n°	4	4	4	4	4	4	4
Minimum water content admitted COLD SIDE		7	7	7	7	7	7	7
Minimum water content admitted the HOT SIDE		7	7	7	7	7	7	7
Recommended water content COOLING SIDE | HEATING SIDE	l/kW	14	14	14	14	14	14	14

WATER FEATURES

PH	6-8
Electric conductivity	Less than 200 mV/cm (25°C)
Chloride ions	Less than 50 ppm
Sulphuric acid ions	Less than 50 ppm
Total iron	Less than 0.3 ppm
Alkalinity M	Less than 50 ppm
Total hardness	Less than 50 ppm
Sulphur ions	none
Ammonia ions	None
Silicone ions	Less than 30 ppm

ATTENTION
The choice and installation of components outside the NRP unit is the installer's responsibility, who must operate according to the code of practice and in compliance with the Standard in force in the country of destination.

ATTENTION
The hydraulic connection pipes to the machine must be suitably dimensioned for the effective water flow rate requested by the system when running. The water flow rate to the heat exchanger must always be constant.

ATTENTION
Wash the system thoroughly before connecting the unit. This cleaning operation will eliminate any residues such as welding drips, scale, rust, or other impurities from the piping. These substances can also deposit inside and cause machine malfunctioning. The connection piping must be adequately supported so that its weight is not borne by the appliance.

ATTENTION
An appropriate load/reintegration system must be prepared, which is engaged on the return line, along with a drain cock in the lowest part of the system. Water disconnectors must be used in systems loaded with anti-freeze or where particular legal provisions apply.

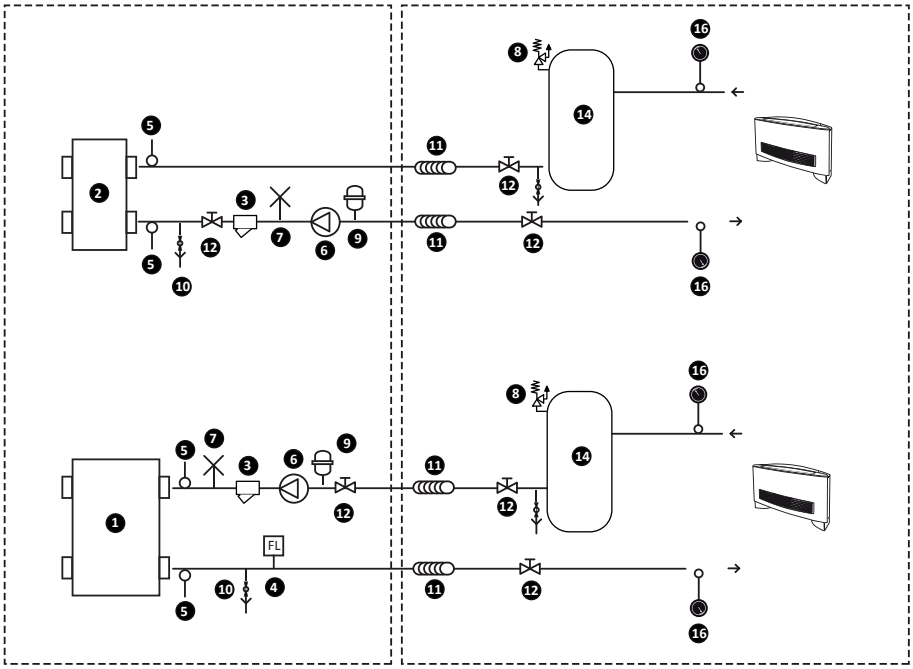
Particular supply/reintegration waters must be conditioned with appropriate treatment systems. The **"water features"** provided in the table can be used as a reference.

ATTENTION
It is prohibited to release water-glycol mixtures into the environment.

ATTENTION
It is recommended to design systems with high water content (minimum recommended values shown in **TAB 3**), in order to limit:
1. The hourly number of inversions between operating modes.
2. Drop in water temperature during winter defrost cycles.

26.2. HYDRAULIC CIRCUIT INSIDE AND OUTSIDE THE NRP "P1...P4 - R1...R4" (with COOLING and HEATING side pumps)

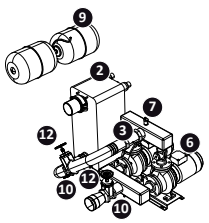
NRP HYDRAULIC COMPONENTS | **HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT**



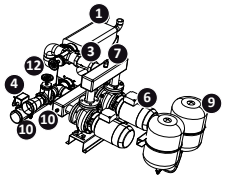
	STANDARD NRP COMPONENTS FOR 2-PIPE SYSTEMS SUPPLIED AS PER STANDARD
1	Plate heat exchanger (COLD WATER PRODUCTION SYSTEM SIDE)
2	Plate heat exchanger (HOT WATER PRODUCTION SYSTEM SIDE)
3	Water filter (supplied)
4	Flow switch (mounted)
5	Water temperature probes (IN/OUT)
6	Pumps
7	Air vent valve
9	Expansion vessel
10	Drain cock
12	Cut-off cocks

	RECOMMENDED COMPONENTS NOT SUPPLIED FOR WHICH INSTALLER IS RESPONSIBLE
8	Safety valve
11	Anti-vibration joints
13	Domestic hot water storage tank (DHW)
14	System water storage tank **(respect the minimum water content, see page 24 of the technical manual or in the event of low loads envision use to prevent continuous ON/OFF of the compressors)**
15	Thermostatic valve
16	Manometer

TAB 3		0800	1000	1250	1400	1500	1650	1800
Number of compressors	n°	4	4	4	4	4	4	4
Minimum water content admitted COLD SIDE		7	7	7	7	7	7	7
Minimum water content admitted the HOT SIDE		7	7	7	7	7	7	7
Recommended water content COOLING SIDE | HEATING SIDE	l/kW	14	14	14	14	14	14	14



DHW SIDE



SYSTEM SIDE

WATER FEATURES

PH	**6-8**
Electric conductivity	Less than 200 mV/cm (25°C)
Chloride ions	Less than 50 ppm
Sulphuric acid ions	Less than 50 ppm
Total iron	Less than 0.3 ppm
Alkalinity M	Less than 50 ppm
Total hardness	Less than 50 ppm
Sulphur ions	none
Ammonia ions	None
Silicone ions	Less than 30 ppm

ATTENTION
The choice and installation of components outside the NRP unit is the installer's responsibility, who must operate according to the code of practice and in compliance with the Standard in force in the country of destination.

ATTENTION
The hydraulic connection pipes to the machine must be suitably dimensioned for the effective water flow rate requested by the system when running. The water flow rate to the heat exchanger must always be constant.

ATTENTION
Wash the system thoroughly before connecting the unit. This cleaning operation will eliminate any residues such as welding drips, scale, rust, or other impurities from the piping. These substances can also deposit inside and cause machine malfunctioning. The connection piping must be adequately supported so that its weight is not borne by the appliance.

ATTENTION
An appropriate load/reintegration system must be prepared, which is engaged on the return line, along with a drain cock in the lowest part of the system. Water disconnectors must be used in systems loaded with anti-freeze or where particular legal provisions apply.

Particular supply/reintegration waters must be conditioned with appropriate treatment systems. The **"water features"** provided in the table can be used as a reference.

ATTENTION
It is prohibited to release water-glycol mixtures into the environment.

ATTENTION
It is recommended to design systems with high water content (minimum recommended values shown in **TAB 3**), in order to limit:
1. The hourly number of inversions between operating modes.
2. Drop in water temperature during winter defrost cycles.

ATTENTION
Check the hydraulic sealing of the joints.

ATTENTION
It is recommended to repeat this operation after the appliance has operated for several hours and to periodically check the system pressure. Reintegration must be performed with machine off (pump Off).

26.3. SYSTEM LOADING

Before starting loading, position the unit master switch at OFF

1. Check that system drain cock is closed
2. Open all system and relative terminals vent valves.
3. Open all system cut-off devices
4. Start filling by slowly opening the system water load cock, outside the appliance.
5. When water starts to escape from the terminal vent valves, close them and continue loading until the envisioned pressure value for the system is reached.

ATTENTION
If the system contains liquid anti-freeze, this must not be drained freely, as it is a pollutant.
It should be collected and if possible reused.

26.4. SYSTEM LOADING

1. Before beginning emptying, place the unit master switch at OFF.
2. Check that the system water loading/reintegration cock is closed.
3. Open the drain cock outside the appliance and all system and relative terminals vent valves

27. ELECTRIC CONNECTIONS

The NRP multipurpose units are completely wired at the factory and only require connection to the electrical mains, downstream from a unit switch, according to that envisioned by the Standards in force on this subject in the country of installation.
It Is also advised to check that:

1. The electrical mains features are suitable for the input values indicated in the electrical data table, also taking any other machines operating at the same time into consideration.
2. The unit must only be powered when installation has been completed (hydraulic and electric).
3. Respect the connection indications of the phase and earth wires.
4. The power supply line must have a relevant protection against short circuits mounted upstream and dispersions to earth, which isolate the system with respect to other utilities.
5. The voltage must be within a tolerance of ±10% of the nominal power supply voltage of the machine (for unbalanced three-phase unit max 3% between the phases). Whenever these parameters are not respected, contact the electric energy public body.
6. For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.

THE FOLLOWING ARE MANDATORY

1. The use of an omnipolar magnet circuit breaker switch is mandatory, in compliance with the IEC-EN Standards (contact opening at least 3 mm), with suitable cut-off power and differential protection on the basis of the electric data table shown below, installed as near as possible to the appliance.
2. It is mandatory to make an effective earth connection. The manufacturer is not liable for any damage caused by the lack of or ineffective appliance earth connection.
3. For units with three-phase power supply, check the correct connection of the phases.

All the electrical operations must be carried out by STAFF IN POSSESSION OF THE NECESSARY QUALIFICATIONS BY LAW, suitably trained and informed on the risks related to these operations.

The features of the electrical lines and of the related components must be determined by STAFF QUALIFIED TO DESIGN ELECTRICAL SYSTEMS, in compliance with the international and national regulations of the place of installation of the unit and in compliance with the regulations in force at the time of installation.

For the installation requirements refer only to the wiring diagram supplied with the appliance. The wiring diagram along with the manuals must be kept in good condition and ALWAYS BE AVAILABLE FOR ANY FUTURE INTERVENTIONS ON THE UNIT.

It is mandatory to verify that the machine is watertight before making the electrical connections and it must only be powered after the hydraulic and electrical works have been completed.

27.1. ELECTRIC DATA TABLE

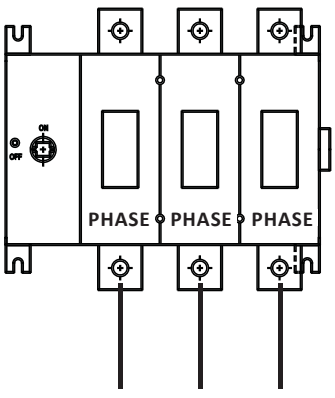
The cable sections shown in the table are recommended for maximum lengths of 50 m.
For longer lengths or different cable laying, it is up to the DESIGN ENGINEER to dimension the appropriate line switch, the power supply line as well as the connection to the earth wire and connection cables depending on:

- the length;
- the type of cable;
- the absorption of the unit and the physical location and also the environment temperature.

ATTENTION
It is prohibited to use the water pipes to earth the appliance.

ATTENTION
Check the tightening of all power wire clamps on commissioning and after 30 days from start-up. Successively check them every six months.
Loose terminals can cause overheating of the cables and components.

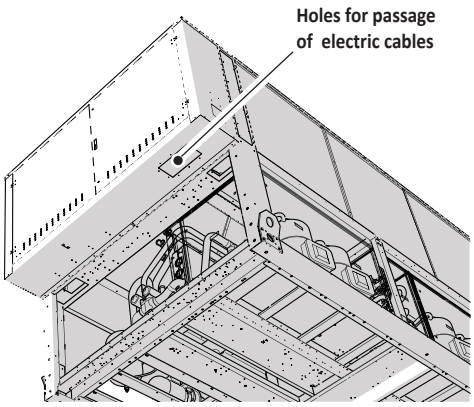
NRP SIZE	Power supply	Compressors [n°]	Fans [n°]	TOTAL INPUT		RECOMMENDED CABLE CROSS-SECTION						
				L.R.A.:	F.L.A.:	SEC. A				SEC. B	EARTH	IL
				[A]	[A]	phases [n°]	cables for single phase [n°]	Cable section [mm²]	Total cables [n°]	[mm²]	[mm²]	[A]
0800	400V/3/50Hz	4	4	348	173	3	1	95	3	1,5	50	200
0900	400V/3/50Hz	4	4	404	195	3	1	95	3	1,5	50	250
1000	400V/3/50Hz	4	4	426	217	3	1	95	3	1,5	50	250
1250	400V/3/50Hz	4	6	535	267	3	1	120	3	1,5	70	315
1400	400V/3/50Hz	5	6	505	296	3	1	120	3	1,5	70	315
1500	400V/3/50Hz	6	6	534	325	3	1	185	3	1,5	95	350
1650	400V/3/50Hz	6	8	633	365	3	2	185	6	1,5	150	400
1800	400V/3/50Hz	6	8	666	398	3	2	185	6	1,5	150	400



KEY

F.L.I.:	Maximum input power	**3+N:**	3 phases + neutral
F.L.A.:	Maximum input current	**Sec B:**	Controls and safety device connection
L.R.A.:	Initial starting current	**EARTH**:	Earth wire to connect to unit
Sec A:	Power supply	**IL:**	Master switch

28. ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS



1. Before connecting the unit to the power supply mains, make sure that the isolating switch is open.
2. Open the front panel.
3. Use the plates to pass the main electric power supply cable and the cables of the other external connections under the responsibility of the installer.
4. It is prohibited to access positions not specifically envisioned in this manual with electric cables.
5. Avoid direct contact with non-insulated copper piping and with the compressor.
6. Identify the clamps for the electric connection and always refer exclusively to the wiring diagram supplied with the unit.
7. For the functional connection of the unit, take the power supply cable to the electric control board inside the unit and connect it to clamps. L1-L2-L3 and PE respecting the polarities.
8. L1-L2-L3 as phases, and PE as earth; see figure.
9. Re-position the inspection panels.
10. Ensure that all protections removed for the electric connection have been restored before powering the unit electrically.
11. Position the system master switch (outside the appliance) at “ON”.

29. CONTROL AND COMMISSIONING

27.2. PREPARATION FOR COMMISSIONING

Please note that, on request by the Aermec customer or the legitimate owner of the machine, the units in this series can be started up by the AERMEC After-Sales Service in your area (valid only on Italian territory). The start of operation must be scheduled in advance based on the frame regarding the realisation of the system. Prior to the intervention, all other works (electrical and hydraulic connections, priming and bleeding of air from the system) must have been completed.

27.3. START -UP

27.3.1. Preliminary operations to be performed with no voltage present

Control:

1. All safety conditions have been respected.
2. The unit is correctly fixed to the support surface.
3. The minimum technical spaces have been respected.
4. That the main power supply cables have appropriate cross-section, which can support the total absorption of the unit. (see electric data sections) and that the unit has been duly connected to earth.
5. That all the electrical connections have been made correctly and all the clamps adequately tightened.

ATTENTION:
Before carrying out the controls indicated below, make sure that the unit is disconnected from the mains electricity. Make sure that the master switch is locked in the OFF position and an appropriate sign is affixed. Before starting the operations, use a voltmeter or a phase indicator to check that there is no voltage present.

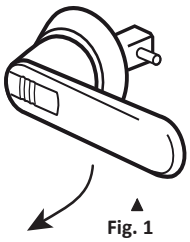


Fig. 1

27.3.2. The following operations are to be carried out when the unit is live.

1. Supply power to the unit by turning the master switch to the ON position; see (fig1.) The display will switch on a few seconds after voltage has been supplied; check that the operating status is on OFF (OFF BY KEY B on lower side of the display).
2. Use a tester to verify that the value of the power supply voltage to the RST phases is equal to 400V ±10%; also verify that the unbalance between phases is no greater than 3%.
3. Check that the connections made by the installer are in compliance with the documentation.
4. Verify that the compressor sump resistance/s is/are operating by measuring the increase in temperature of the oil pan. The resistance/s must function for at least 12 hours before start-up of the compressor and in any event, the temperature of the oil pan must be 10-15°C higher than room temperature.

HYDRAULIC CIRCUIT

1. Check that all hydraulic connections are made correctly, that the plate indications are complied with and that a mechanical filter has been installed at the evaporator inlet. (Mandatory component for warranty to be valid).
2. Make sure that the circulation pump/s is/are operating and that the water flow rate is sufficient to close the flow switch contact.
3. Check the water flow rate, measuring the pressure difference between evaporator inlet and outlet and calculate the flow rate using the evaporator pressure drop diagram present in this documentation.
4. Check correct operation of the flow meters, if installed; on closing the cut-off valve at the heat exchanger outlet, the unit must display the block. Finally, open the valve and rearm the block.

27.4. MACHINE COMMISSIONING

After having performed all controls stated above, the unit can be started by pressing the ON key. The display shows the temperature of the water and machine operating mode. Check the operating parameters set (set-point) and reset any alarms present. The unit will begin operating after a few minutes.

ATTENTION
Commissioning must be performed with standard settings. Only when the inspection has been completed can the functioning Set Point values by changed.
Before start-up, power the unit for at least 12-24 hours, positioning the protection magnet circuit breaker switch and the door lock isolating switch at ON.
Make sure that the control panel is off in order to allow the compressor oil sump to heat.

27.4.1. With the machine on, check

COOLING CIRCUIT
CHECK:
- That the compressor input current is lower than the maximum indicated in the technical data table.
- That in models with three-phase power supply, the compressor noise level is not abnormal. If this is the case, invert a phase.
- That the voltage value lies within the pre-fixed limits and that unbalance between the three phases (three-phase power supply) is not above 3%.
- The presence of any refrigerant GAS leaks, particularly in correspondence with the manometers pressure transducers and pressure switches pressure points (vibrations during transportation may have loosened the fittings).
- Overheating
  Comparing the temperature read using a contact thermostat positioned on the compressor intake with the temperature shown on the low pressure manometer (saturation temperature corresponding to the evaporation pressure). The difference between these two temperatures gives the overheating value. Optimal values are between 4 and 8°C.
- Pressing line temperature. If the subcooling and overheating values are regular, the temperature measured in the pressing line pipe at the outlet of the compressor must be 30/40°C above the condensation temperature.

CONTROL AND SAFETY DEVICES
CHECK:
- **The manual reset high pressure switch.**
  That stops the compressor, generating the respective alarm, when the flow pressure exceeds the set-point value. Its correct operation can be controlled by closing the air intake to the exchanger (in cooling mode) and keeping the high pressure manometer under control, check the intervention in correspondence of the calibration value. Attention: if there is no intervention at the calibration value, stop the compressor immediately and check the cause. Reset is manual and can only take place when the pressure drops below the differential value. (For the set and differential values, consult the technical manual).

- **The anti-freeze control**
  The anti-freeze control managed by electronic regulation and by the temperature probe located at the evaporator outlet is to prevent the formation of ice when the water flow rate is too low. Correct operation can be checked by progressively increasingly the anti-freeze set-point until it exceeds the outlet water temperature and keeping the water temperature controlled with a high precision thermometer, verify that the unit is off and generates the respective alarm. After this operation, take the anti-freeze set-point back to its original value.

30. OPERATING FEATURES

30.1. SET-POINT IN COOLING MODE

(Factory set) = 7°C, Δt = 5°C.

30.2. SET-POINT IN HEATING MODE

(Factory set) = 45°C, Δt = 5°C.
If the unit power supply is restored after a temporary interruption, the mode set will be kept in the memory.

30.3. COMPRESSOR START-UP DELAY

Two functions have been set-up to prevent compressor start-ups that are too close.
- Minimum time from last switch-off 60 seconds in cooling mode.
- Minimum time from last switch-on 300 seconds in heating mode.

30.4. CIRCULATION PUMPS

The circuit board envisions outputs for the management of the circulation pumps.
The pump side utilities start immediately. After the first 30 seconds of operating, when the water flow rate has gone into normal working conditions, the flow meter control functions are activated (if envisioned).
Below find the compressor start-up procedure, by switching the source side pump on, with flow meter check if enabled after 20 seconds.
Whenever alarms do not occur, the compressor starts.

30.5. ANTI-FREEZE ALARM

The anti-freeze alarm [11] is active if the machine is off or in stand-by mode. In order to prevent the heat exchanger from breaking due to the water it contains freezing, envision compressor block (if the machine is on below 3.5°C) and ignition of the resistance (if in stand-by below 5°C). If the temperature detected by the probe positioned at heat exchanger output and at chiller inlet is less than +3.8°C.

The intervention of this alarm [12] determines compressor block and not pump block, which remains active along with the switch-on of the resistance if installed. To restore normal functions, the temperature of the outlet water must rise above the differential. Rearm is manual.

30.6. WATER FLOW RATE ALARM

The unit manages a water flow rate alarm controlled by a pressure switch or flow switch, installed as per standard on the machine. This type of safety device can intervene after the first 30 seconds of pump operation, if the water flow rate is not sufficient.
The intervention of this alarm determines compressor and pump block.

ATTENTION
[11] This anti-freeze set temperature can only be varied by an authorised after-sales centre and only after having checked that there is anti-freeze solution in the water system.

[12] Whenever this alarm intervenes, call the nearest after-sales service immediately.

Control panel

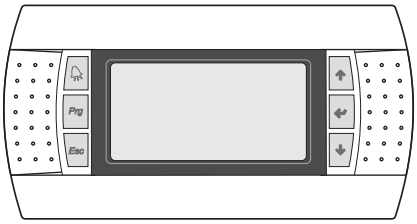


fig. 1

fig. 2

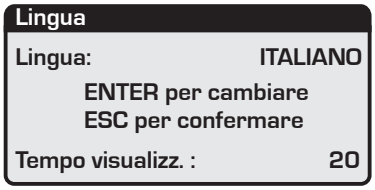
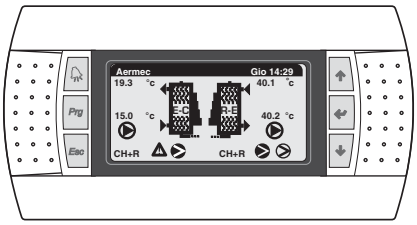


fig. 3 Main display



31. SWITCH-ON AND USE OF UNIT

Once the unit has been powered, the control panel will switch on after 30 sec. displaying:

1. the window (fig. 1) which will remain active for 6 sec before passing to the window used to select the language (fig. 2)
2. The second window makes it possible to select the software language [1]. It will remain active for 20 sec, before passing on to the **window/ main menu (fig. 3).**

The NRP unit control panel allows to set machine operating parameters and their display quickly.

The display is made up from a 132 x 64 pixel graphical matrix in order to signal the type of operation, displaying set parameters and any alarms that have intervened.
All default settings and any modifications are memorised in the board.

The control panel is represented by a graphical display with six keys for browsing through the displays which are organised in **MENUS**.
The **main display is (fig. 3)**
Browsing the various **menus/parameters takes place by**:

1. Pressing the "*Prg*" key to enter the menu selection mode.
2. Press the "↑ ↵ ↓" keys on the right side of the panel to browse; these keys are also used to modify the selected parameters.

31.1. MENU STRUCTURE

A **IN/OUT MENU**
Temperature, pressures, etc... of the various unit components

B ON/OFF MENU
Switches the unit on or off and sets its operating mode (summer/winter) and any time periods

2-PIPE VERSIONS

C PLANT MENU
Management of the chiller, standard/energy saving work set-point parameters

D DHW SYSTEM MENU
Parameters management (set-point, consent, temperature, time periods, etc...)

4-PIPE VERSIONS

C COOLED WATER MENU
Management of the chiller, standard/energy saving set-point parameters in cooling mode

D HOT WATER MENU
Management of the chiller, standard/energy saving set-point parameters in heating mode

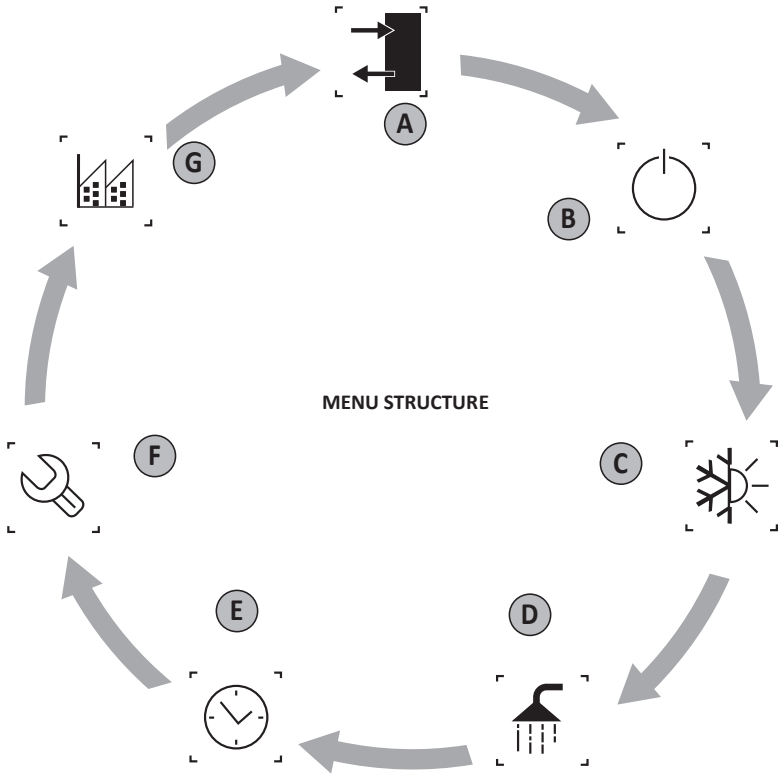
E CLOCK MENU
Manages all parameters linked to system time (hour, date, etc....)

F SUPPORT MENU
Protects the after-sales assistance menu with password request.

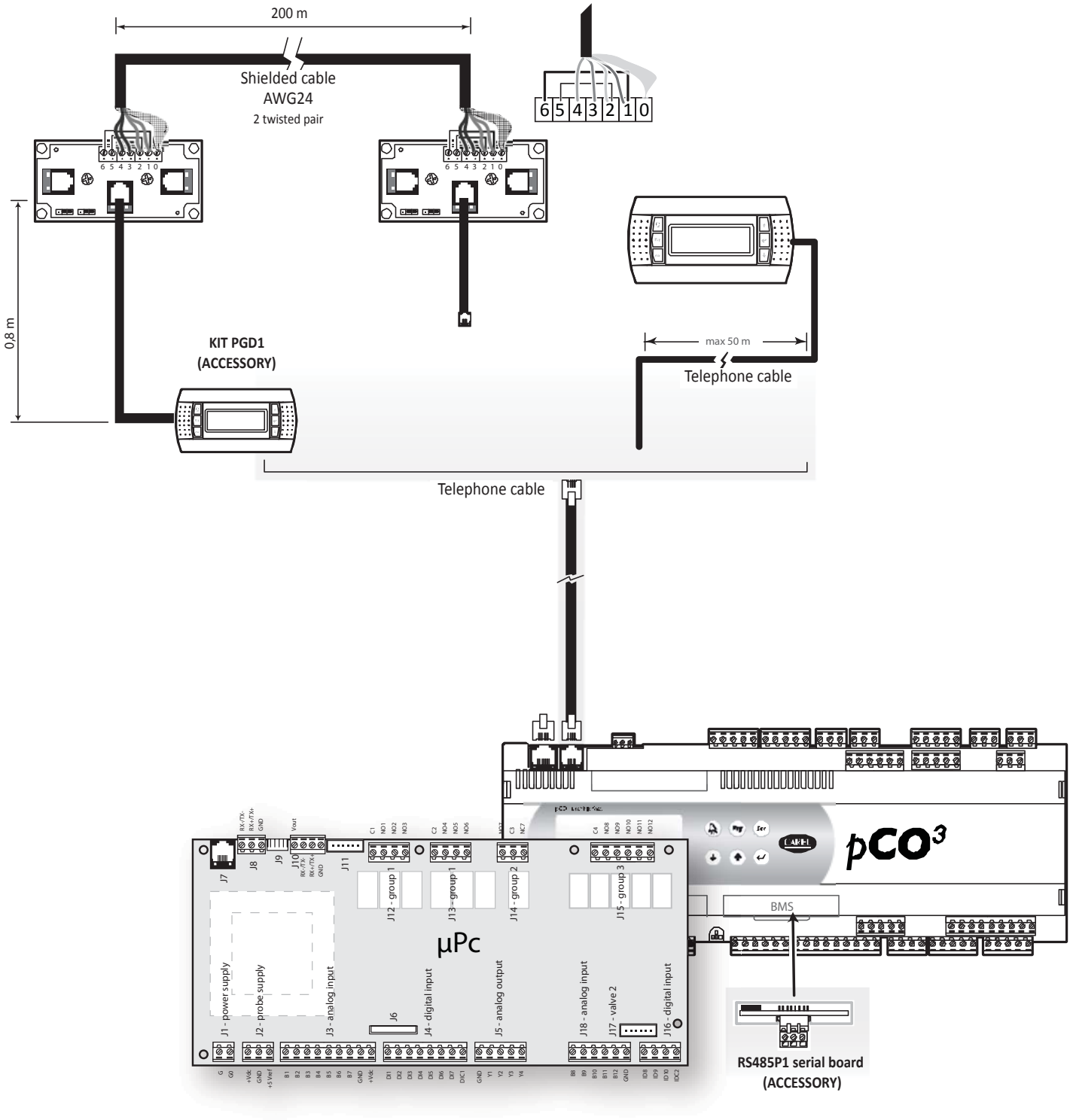
G MANUFACTURER MENU
Protects the manufacturer menu with password request

Note
For further information refer to the user manual.

[1] **ATTENTION:**
Only qualified staff can change the language by accessing the assistance menu.
When 20 seconds have passed, it will no longer be possible to modify the language until the next time the board is restarted.



32. ACCESSORY CONNECTIONS



ANOMALY	CAUSE	REMEDY
The unit does not start	• No electric voltage	• Check the presence of voltage • Check the safety systems upstream from the appliance
	• Master switch at OFF • Remote switch at OFF (if present) • Control panel at OFF • Main switch at OFF • Compressor magnet circuit breaker at OFF	• Position at ON
	• Power supply voltage too low	• Check power supply line
	• Remote control switch coil broken • Circuit board broken • Peak condenser broken • Compressor broken	• Replace the component
Insufficient yield	• No refrigerant • Dirty coils • Water filter clogged • Appliance dimensioning • Operation outside of operational limits	• Check the load and any leaks • Clean the coils • Clean the filter • Check • Check the operational limits using the graphics
Noisy compressor	• Liquid return to the compressor • Inadequate fixing	• Check
	• Inverted phase	• Invert a phase
Noise and vibrations	• Contacts between metal bodies	• Check
	• Weak support	• Restore
	• Loose screws	• Tighten the screws
The compressor stops due to intervention of the protections	• Excessive flow pressure • Low intake pressure • Low power supply voltage • Electric connections fastened badly • Operation outside of operational limits	• Check the operational limits using the graphics
	• Pressure switch malfunctioning	• Replace the component
	• Circuit breaker protection intervention	• Check power supply voltage • Check electric isolation of the windings
Compressor high discharge pressure	• High external water temperature • High utility water inlet temperature	• Check the operational limits using the graphics
	• Insufficient air flow • Insufficient water flow	• Check: 1. Fan operation 2. Cleanliness of the coils 3. Pump operation (speed) 4. Filter cleanliness
	• Fan regulation anomalous operation	• Check or replace if broken
	• Air in the hydraulic system	• Bleed the circuit
	• Excessive refrigerant gas load	• Restore the correct load
Low discharge pressure	• Low external air temperature • Low inlet water temperature	• Check the operational limits using the graphics, as above
	• Humidity in the cooling circuit	• Empty and restore the gas load
	• Air in the hydraulic system	• Bleed the circuit
	• Insufficient gas load	• Restore the correct load
High intake pressure	• High external air temperature • High utility inlet water temperature • Thermostatic expansion valve too open or damaged	• Check the operational limits using the graphics • Adjust or replace if damaged
Low intake pressure	• Low utility water inlet temperature • Low external water inlet temperature • Thermostatic expansion valve damaged or blocked	• Check the operational limits using the graphics • Adjust or replace if damaged
	• Insufficient water flow • Insufficient air flow	• Check: 1. Fan operation 2. Cleanliness of the coils 3. Pump operation (speed) 4. Filter cleanliness

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